OFFICIAL PUBLICATION OF THE PROCEEDINGS AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

JUN 2

MAY 28, 1951
VOLUME 40, No. 11

AMERICAN DYESTUFF REPORTER

DEVOTED TO TEXTILE CHEMISTRY · BLEACHING · DYEING · PRINTING · FINISHING

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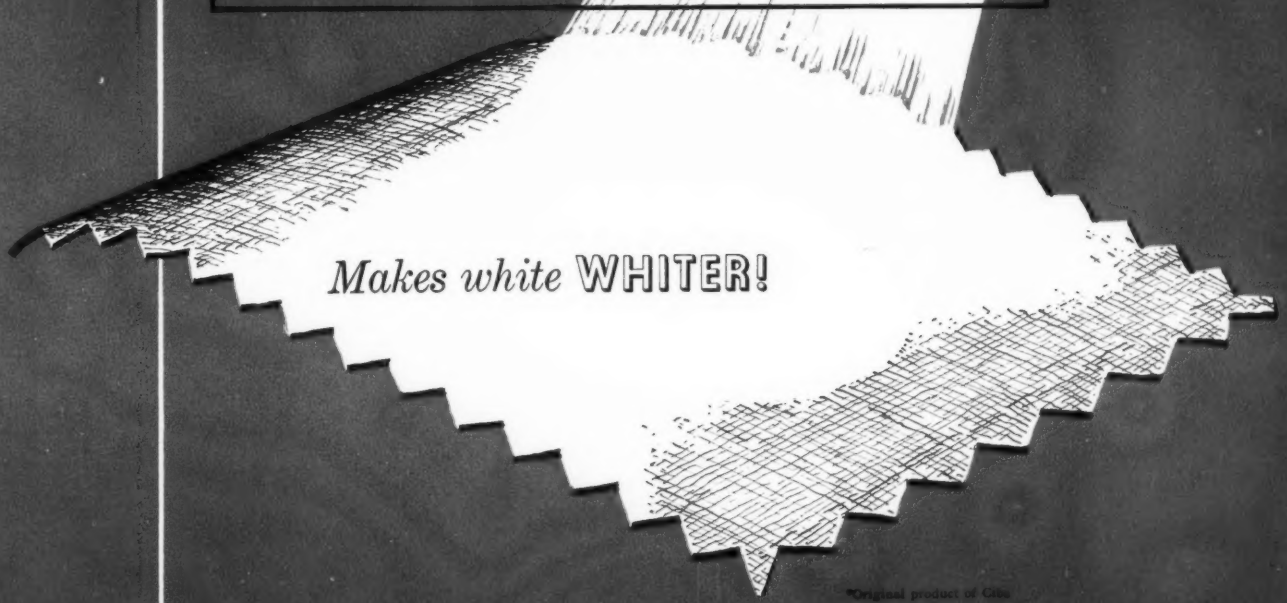

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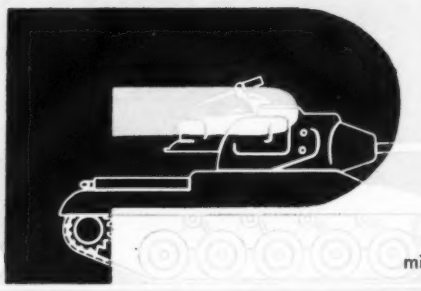

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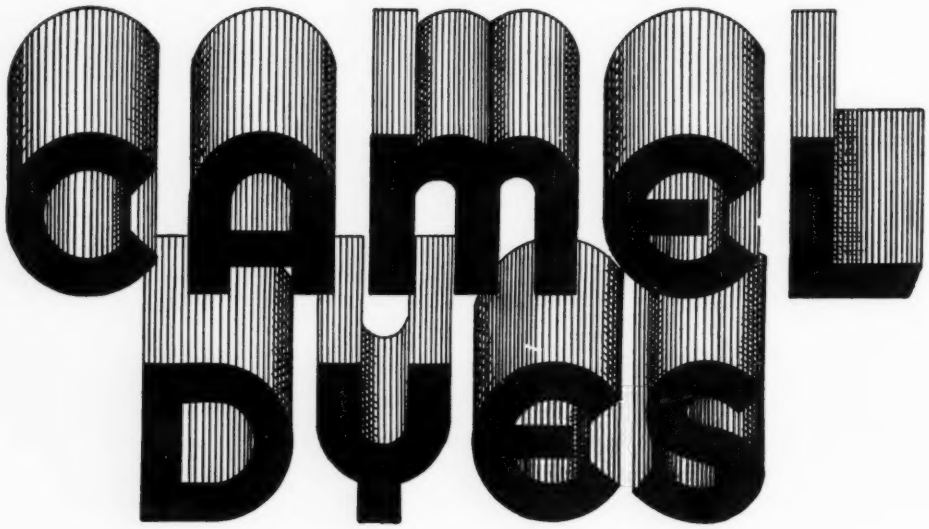

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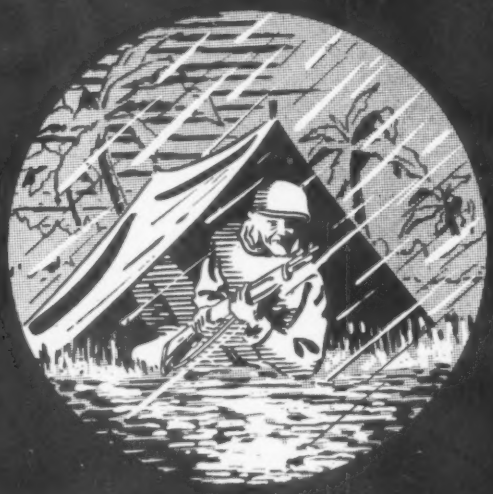

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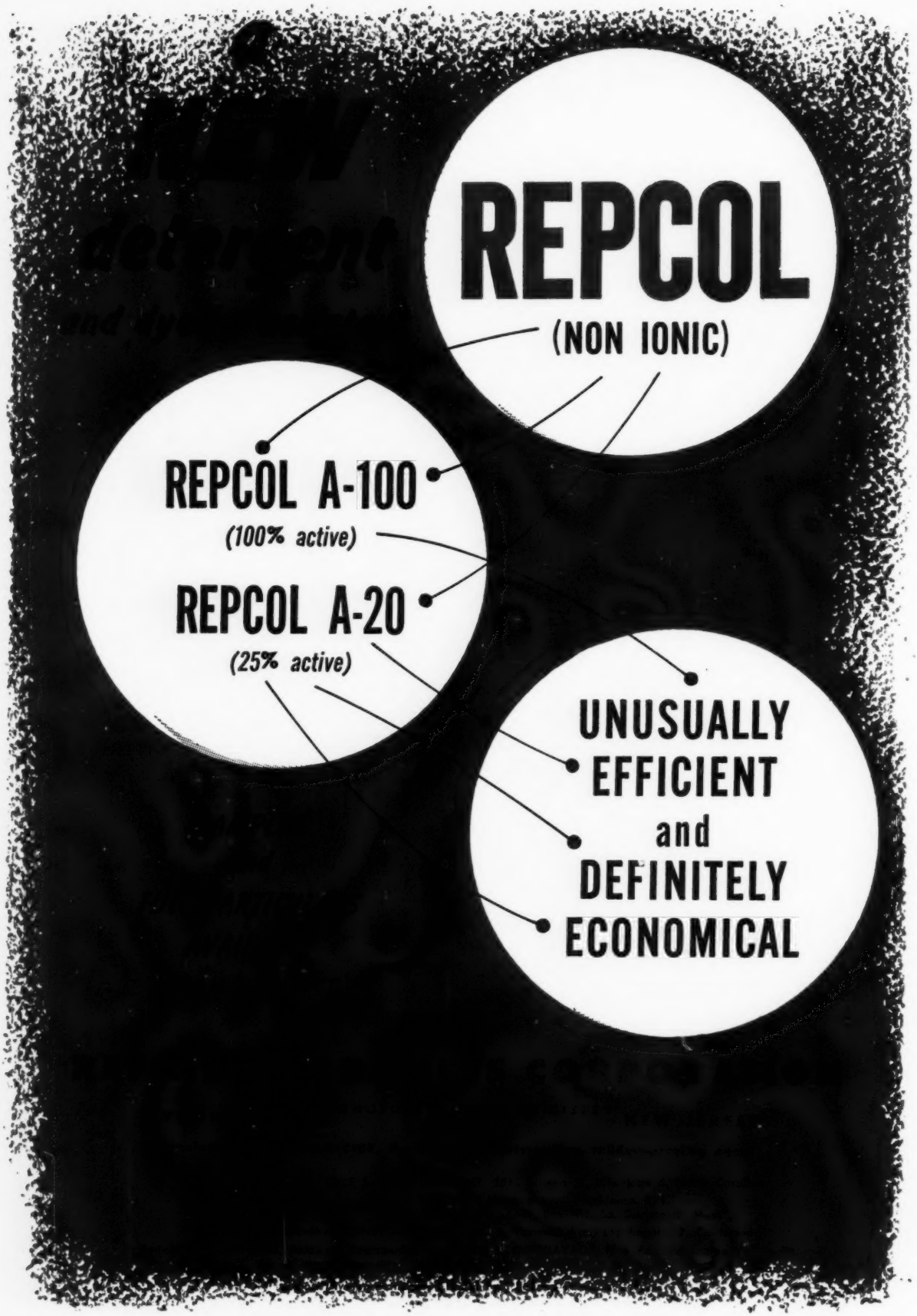
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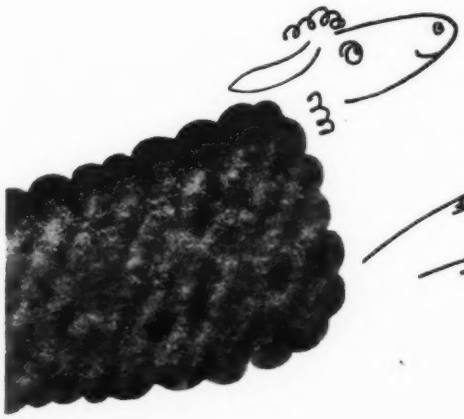

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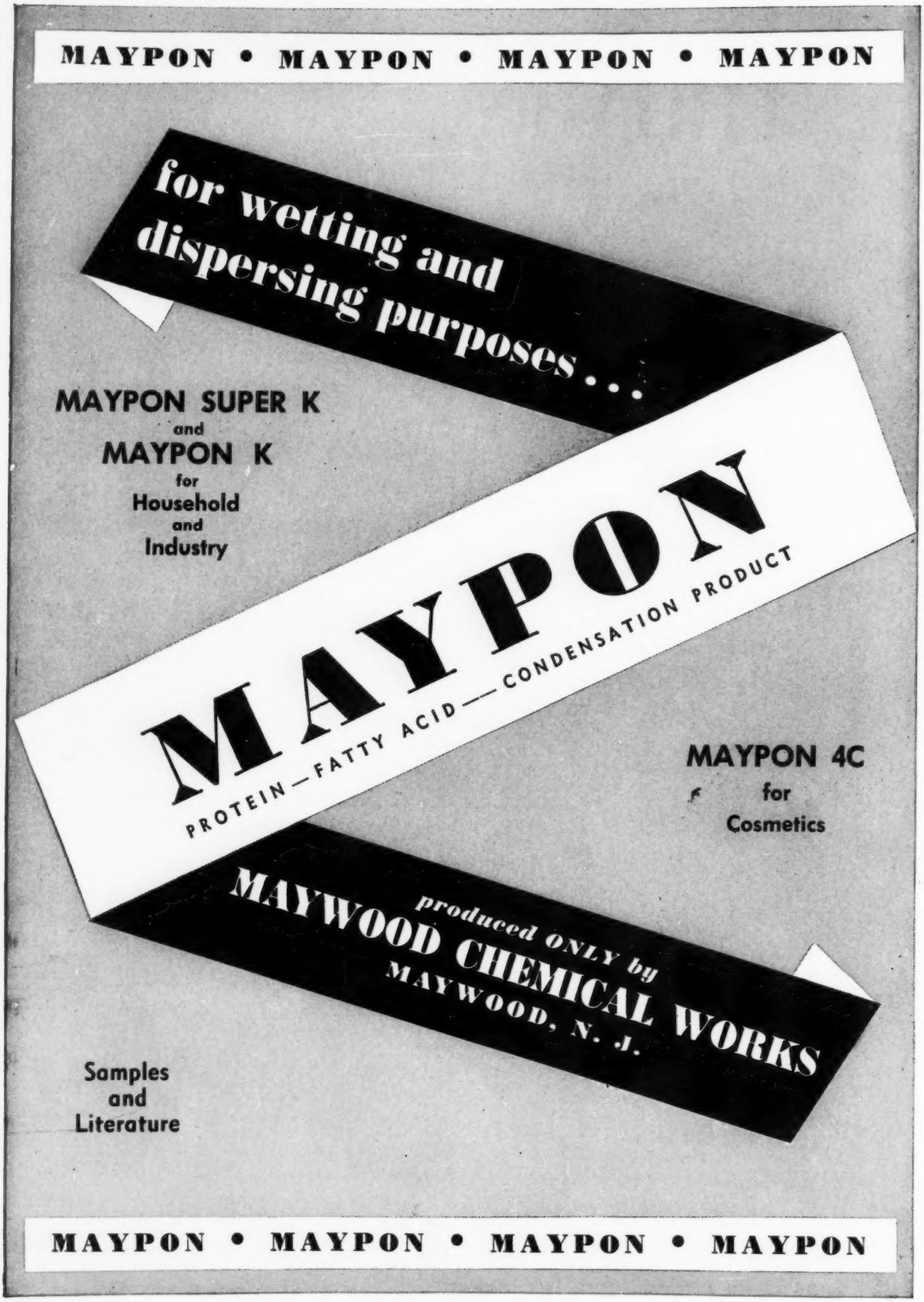
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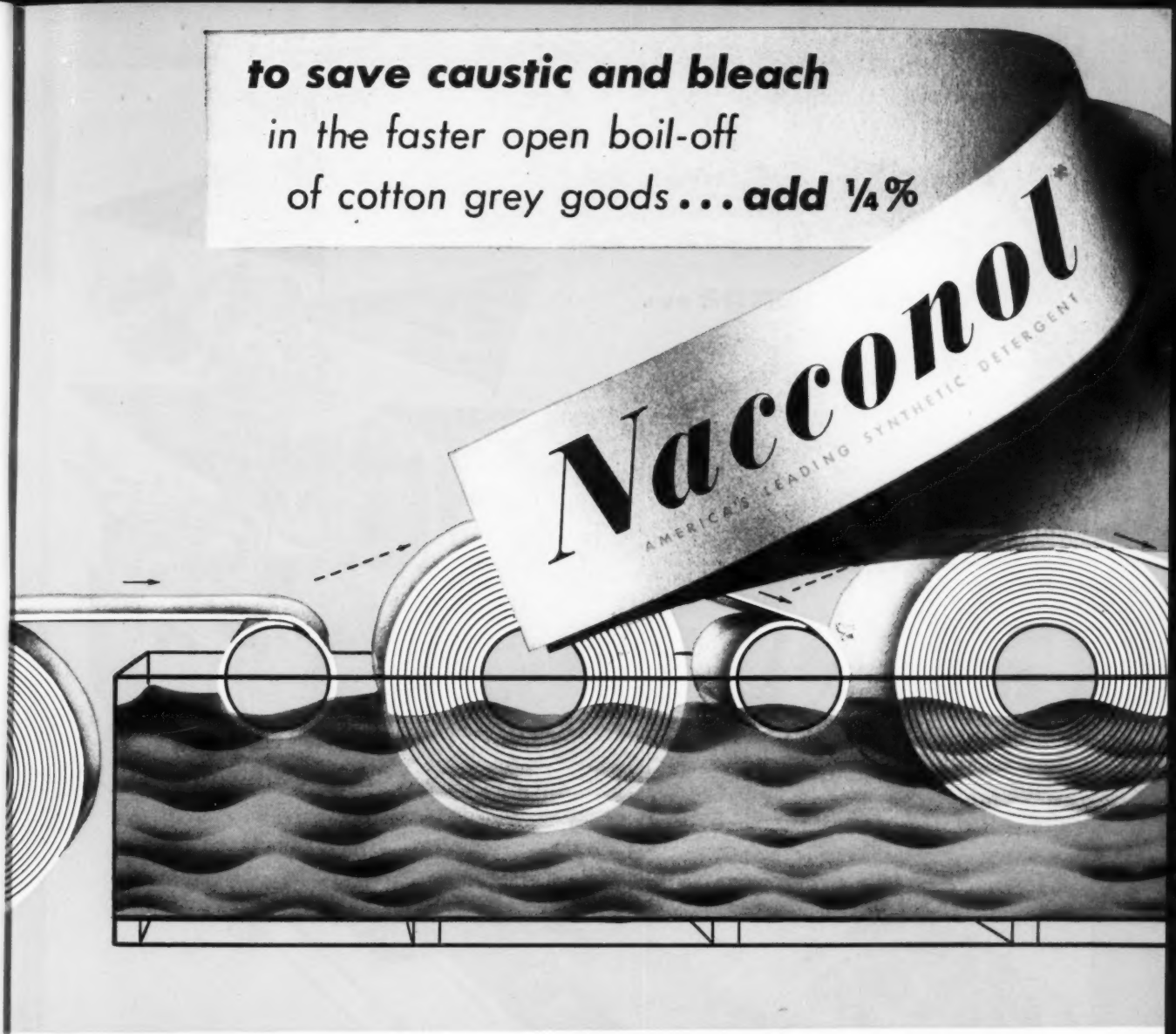
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National Technical Bulletin #311 contains 12 pages of significant test results on this important way to save time and money on boil-off operations. For your copy, write, wire or phone our nearest office.

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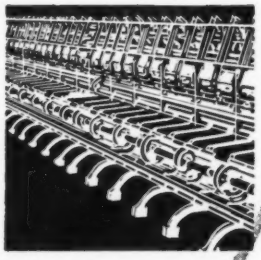

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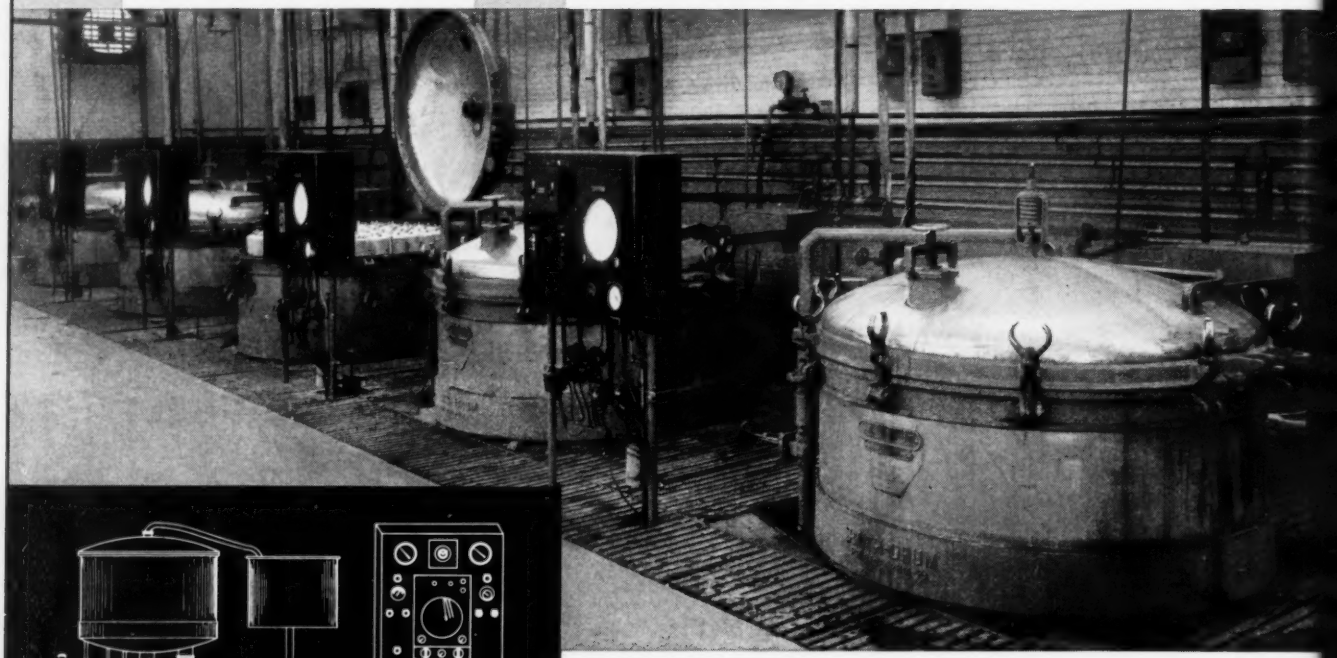

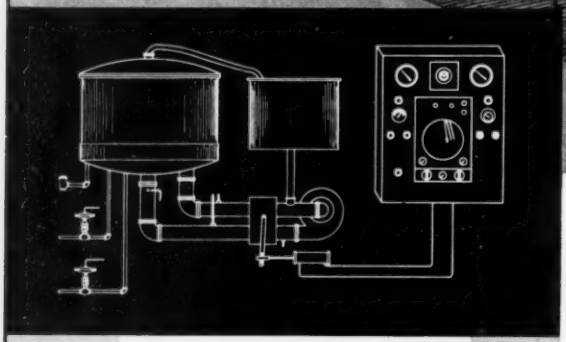

Those three, important production qualities can be more easily and effectively maintained by your Kettle operator ... when the process is guided by a Brown Package Dyeing Control System.

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- *Maintenance of optimum temperature.*
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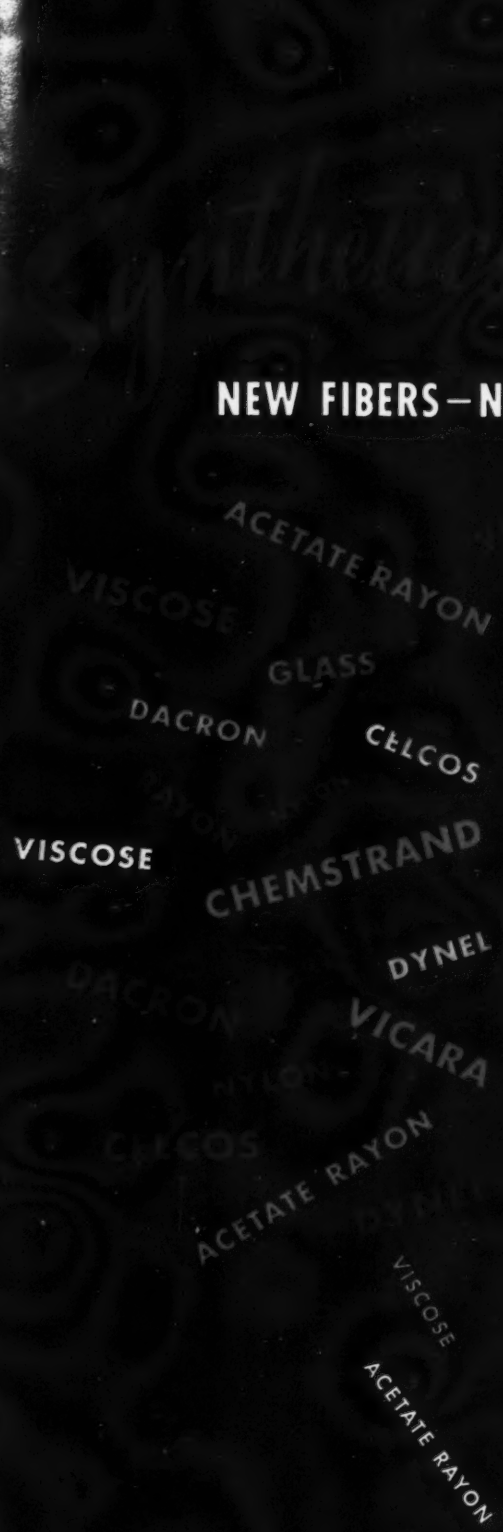
NEW FIBERS—NEW TECHNIQUES—NEW PROBLEMS



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we offer practical assistance based upon the accumulated experience of our Research Laboratories and Field Technicians.

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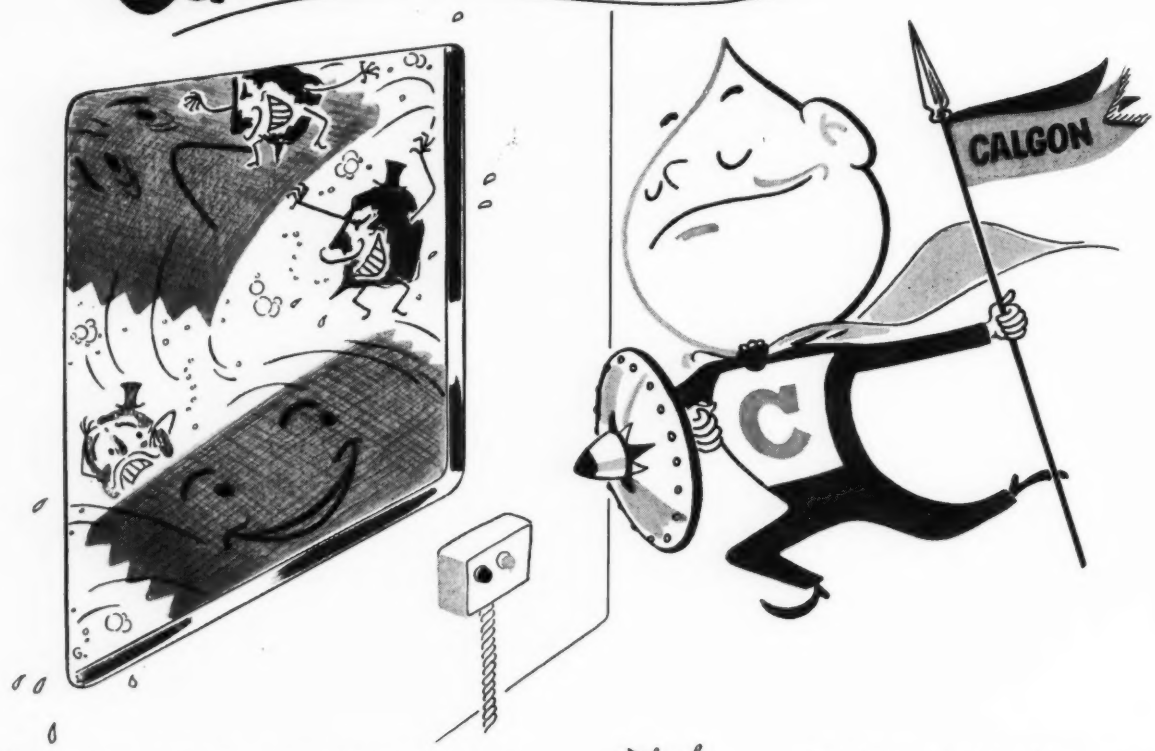
GENERAL DYESTUFF CORPORATION

"Cal" to the Colors



"I'd like to know what goes on here," thought Cal Gon as he was tossed into the dye tub. "Um-m, salt," he added, "what am I supposed to be doin' in this bluein'?"

Just then he caught sight of a furtive ferrous ion sidling past. "Hey, you!" he shouted, "You just don't look good to me—definitely off color. Just slip into my sequestering sack." Then he chuckled as a horrible pun struck him. "Sort of an ironic situation, ain't it my dull friend?"

Then Cal's brothers—a methodical mob of lanky ions of complex phosphate—advanced across a plain of textile fabric, ankle deep in a sticky mud of lime soap. They shoveled this up, hauled out the calcium and magnesium ions, tossed them into the sack, and pushed cooperative sodium ions into the vacancies.

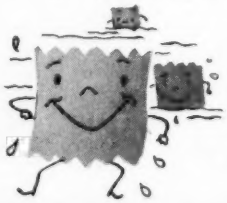
With the evidence of rejuvenated soap bubbles floating gracefully on the surface and the multitude of bright blue molecules of dye rushing to complete their duties in a more peaceful environment, Cal sensed that he was part of a tremendous undertaking.

Wandering off with his sequestered iron and calcium ions all tied up, Cal poked his head thru the surface of the dye just in time to hear the foreman and super say:

"Look at that clear foam riding on the surface—remember the junk that used to collect around the tub? Boy, that Calgon* you suggested is great stuff."

"Iron doesn't seem to bother you any more, does it? For a long time I haven't seen any of those dull shades we used to get and our finished rejects are lower."

Cal swung his sequestering sack of calcium ions over the other shoulder—"So that's the score is it? Why you miserable little fugitives from a bed of limestone. I'll keep you tied up till I get out of here, even if I hydrate for it."



The fabric was coming out of the tub now, a beautiful uniform shade of blue. Cal thrilled with pride as the cold wash water forced him down the drain still clutching the sack of evil ions safely sequestered.

*CALGON *is the registered trade mark of Calgon, Inc. for its vitreous phosphate products.*

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Eastman Fast Yellow GLF possesses excellent fastness to gas and light and is widely used in coloring drapery and upholstery fabrics. It is ideally suitable where shades of yellow are required for premium dyeing and at a nominal cost.

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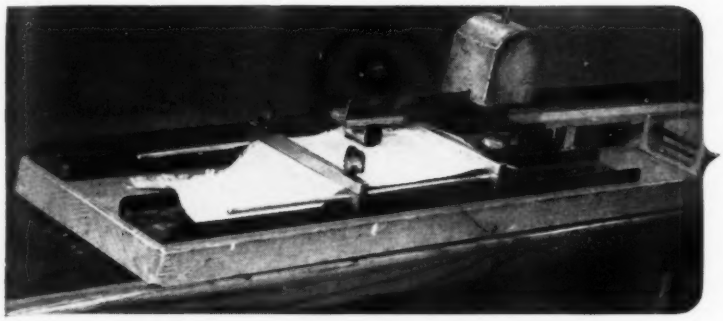
Fewer seconds...fewer rejects with **Syton** for SLIPPAGE CONTROL



United States Testing Co. Inc. slippage control tester in use at Monsanto's Textile Chemical Department Laboratories.

Now you can put a sub-microscopic, anti-slip "tread" on smooth, slippery filament yarns with Syton alone or as part of the finishing formula. In many cases, practically 100% reduction in slippage is obtained in filament fabrics. Syton is a colloidal silica dispersion which is applied on the pad, on the jig, or in the final rinse following a wash. It's stable and compatible with a wide variety of finishing agents.

Anti-Slip Agent in Wet Processing: Many finishers use Syton to control slippage in some low-end constructions in scouring, dyeing and finishing.

Delustering Effects are achieved with larger concentrations of Syton alone or in conjunction with pigment dullers.

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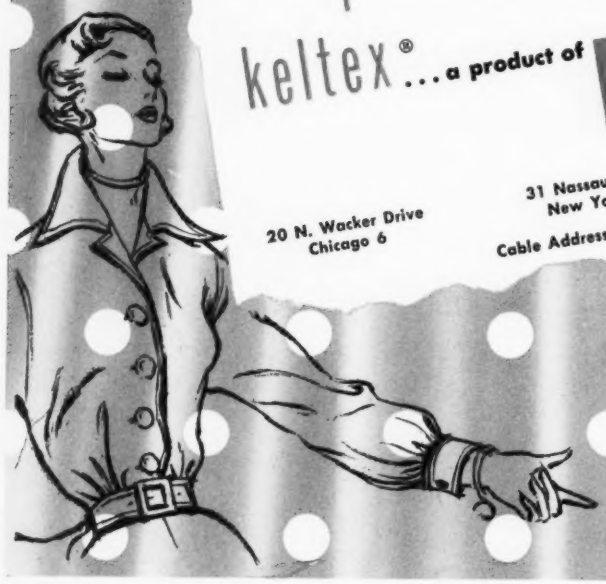

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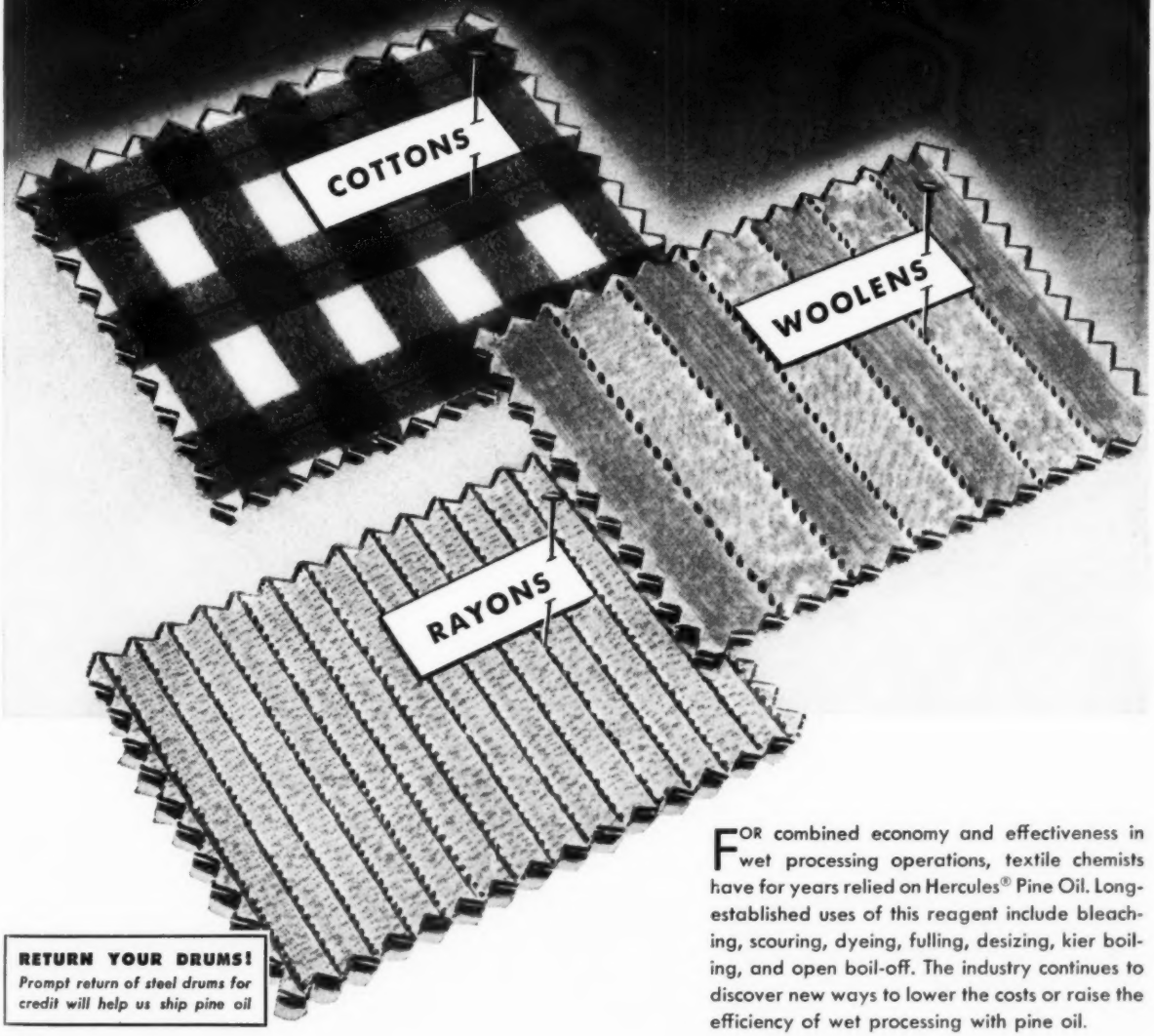

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MAY 28, 1951
VOLUME 40 NUMBER 11

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VOLUME 40 MAY 28, 1951 NUMBER 11

THE EFFICIENCY RATING OF WASHING MACHINES

H J WOLLNER and A I ANDERSON

American Conditioning House, Inc
Boston, Massachusetts

WASHING MACHINES produced for domestic use or for employment in commercial laundries accomplish the objective for which they are constructed—namely, dirt removal from fabrics—by means of mechanical agitation of the clothes in conjunction with soil-loosening chemical activity of the washing solution. Several baths are required to bring about, through straight dilution, the elimination of the dissolved and suspended soil. The greater the number of suds and rinses, the more complete the removal of this soil.

The mechanical agitation exerted by the mechanism of a washer is applied according to several principles. The most commonly used principle, particularly for large washers, is that of cylinder rotation, which causes the clothes to be lifted and dropped continuously. Not only is a compressive action exerted by this means, but the clothes also receive a substantial amount of rubbing and flexing. The speed with which dirt is suspended or dissolved by the detergent solution is dependent in a large degree on the efficiency of this work input as it is imparted to the fabrics. Other forms of introducing mechanical action to the clothes are commonly used. The agitator type of washer is employed extensively for domestic washing. Rocker types of washers, squeeze roll washers and washers manipulating the clothes through water or air movement find limited and specialized uses in laundering.

It may be demonstrated that the soaking of clothes in a detergent solution without the implementation of movement of the clothes will not effect adequate dirt removal. The movement of the clothes throughout the detergent solution, together with the alternate compression and relaxation of the fabric serves not only to expel dirt particles from their fabric and fiber locations, but also to carry the detergent molecules to the soil areas. Therefore, it may be stated that the detersive efficiency of any detergent product will vary with the conditions under which it is used and applied. A washing machine that is improperly operated or incorrectly designed could seriously impair the functioning of even the best detergent.

A I Anderson

This article should be of significance to mills and laboratories using washing machines for detergency evaluation or study of the behavior characteristics of fabrics in washing.

The American Conditioning House, Inc, over the course of the last four years has conducted comprehensive studies and research in the fields of detergency evaluation and washing equipment development, both for private industry and the U S Government Quartermaster Corps.

In commercial laundries particularly, it is recognized that such factors as rotational speed of cylinders, lifting capacity of cylinder ribs, diameter of cylinder, weight of clothes per cubic foot of cylinder space, reversals per minute, size and number of cylinder perforations, etc, separately and combined influence the speed and effectiveness of soil removal and rinsing efficiency. The influence of these factors is also of significance with respect to the effect of the washing treatment on fabrics. The shrinkage and felting of wool may be cited as a type of fabric behavior largely related to the nature of the mechanical energy supplied in washer operation.

No mathematical formula has been developed to date that will accurately reveal the relative washing or dirt removal efficiencies of washing machines that are not identical in construction and operational characteristics. The laundry industry has for years used simple tables for rating capacities of washers on a basis of pounds per cubic foot of cylinder space. While this method has served the purpose of rough comparison of washers from the single viewpoint of pounds of clothes that the washer will hold, it has failed to predict the effectiveness of one washer in comparison with another in the matters of effectiveness of soil removal and *production* capacity.

The importance of "production capacity" may be illustrated most aptly by an example:

> If two washers have identical loading capacities, but one requires twice the amount of time to achieve a certain quality of washing as the other, then obviously, one washer has double the production capacity of the other.

Methods have been developed, however, for calibrating washers in terms of speed and effectiveness of dirt removal as well as effect on fabrics. Such methods, with reference to dirt removal efficiency, are based on the fact that the amount of dirt removed from a fabric, under standardized conditions of formula and loading, is directly a measure of the efficiency

of the washer.

The procedure developed for the determination of the level of dirt removal obtainable in a certain washer comprises the measurement of the quantity of carbon black removed during washing from specially prepared soil fabrics. A relatively large number of swatches made from this cloth are distributed throughout the load of clothes in the washer. It has been found that at least twenty of these swatches must be used in order that the results will be statistically significant. After the washer is run according to a specified formula with accurate control, the pieces are measured by a photometer for determination of the degree of soil removal. This degree of soil removal is an index of the washing efficiency of the washer under test.

An actual test of two washers according to the method of calibration showed the following results:

Based on a cubic content capacity rating, washer A was rated at 22.2-lb capacity, while washer B was rated at 25-lb capacity. However, as the soil removal figures reveal, washer A, even with a load of 30-lb, surpassed in efficiency washer B, at 25 lb-loading.

In addition to providing a dependable method for calibrating a washer for dirt removal efficiency at various loadings, the test procedure makes possible the determination of the degree of uniformity of washing accomplished at different machine loadings. This determination depends upon a statistical inspection of the reflectance readings of the various swatches. A high coefficient of variation indicates nonuniform washing, with some fabrics receiving a greater degree of washing action than others.

Inasmuch as washers of different operating principles and varying size, speed, etc, cannot be identical in washing efficiency, it follows that careful consideration must be given to equipment used and operating conditions employed when tests for detergent evaluation are conducted in washing machines. The results of such evaluations will be relative and subject to wide variations when applied to practical, commercial operations where conditions differing from those of the test procedure are encountered. This observation finds verification in the experiences of some detergent manufacturers who have found out that laboratory efficiency ratings of their products were not always borne out in practical application.

In the development of test methods for determination of fabric shrinkage, color fastness or detergency, where washers are employed, it would be absolutely essential to specify not only the type of washing machine, but also the details of operation with special reference to water levels, weight of load, and cloth to liquid ratio. In cases where different washers are used from one laboratory to another, a calibration between machines is a necessary requirement if test results are to be in concordance.

	20-lb loading	*25-lb loading*	*30-lb loading*
Washer A	64.4% reflectance	63.0% reflectance	60.2% reflectance
Washer B	60.5% reflectance	57.0% reflectance	57.1% reflectance

• PATENT DIGEST •

PAUL WENGRAF

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DYEING——Development by Passage Through Liquid Metal Alloys C, 1

French Pat 900,758
(I G Farbenindustrie—July 9, 1945)

This patent, although published almost five years ago, might be discussed because of the current interest in the "Standfast Molten Metal" process and its relationship thereto. The preamble of this specification enumerates standard developing thermic methods for dyeings and prints, eg, passage over heated drums, or between hot plates by radiation, by gas burners or by any steaming process. It is mentioned that the passing of the dyed goods through warm oil, proposed elsewhere, did not give satisfactory results.

The fabric is subjected to a treatment in a liquid metal bath, the temperatures of which may be adjusted to 100° C or more by employing an appropriate alloy. Pure or unalloyed fused metals can also be used under certain conditions.

The effect can be further modified by changing the speed of the passage. Alloys of Pb, Bi or Cd or of Pb, Bi or Sn are preferred. They can be melted by electrical means, by heating in a furnace or by connecting the metal bath as a resistance in an electric circuit.

A great advantage of this method is that no large quantities or air or steam have to be heated; the metal bath requires a small space and consequently only a minor amount of heat. Constant temperatures can easily be maintained during the passage, which may be either very short, acting as a sudden impact on the dyestuff, or somewhat longer in other instances according to the substance to be fixed.

Several examples are given with reference to dyeing or printing vat dyes, Indigosols (eg, Indigosol of Indanthrene Blue BC), Rapidogen and direct dyes. The dyebath or the printing paste contain the normal ingredients. The moist fabric passes a metal bath composed of 500 g Pb, 300 g Sn and 200 g Cd or of 300 g Bi, 500 g Sn and 300 g Pb at temperatures between 120-145° C.

It should be mentioned further that this invention is not restricted to coloring processes; some of the examples suggest preparing with resin precondensates and following with baking in the metal bath to obtain durable or creaseproof finishes. Finally, it is suggested that impregnation be carried out with an emulsion of octadecyl-N-N'-ethylene urea (a product of the "Persistol" group), in which water resistant effects result in a similar aftertreatment.

SCREEN PRINTING APPARATUS D, 4

Brit P 646,172
(Geiringer, Nov 15, 1950)

This apparatus consists (as illustrated in Fig 1) of a device (7A) bearing the roller on which the fabric is printed, an endless blanket (6) to which the fabric (7) is pasted when conveyed over table (1), a system of rollers separating blanket and fabric after printing, and a drying chamber for the printed goods. The blanket passes a washing and brushing device

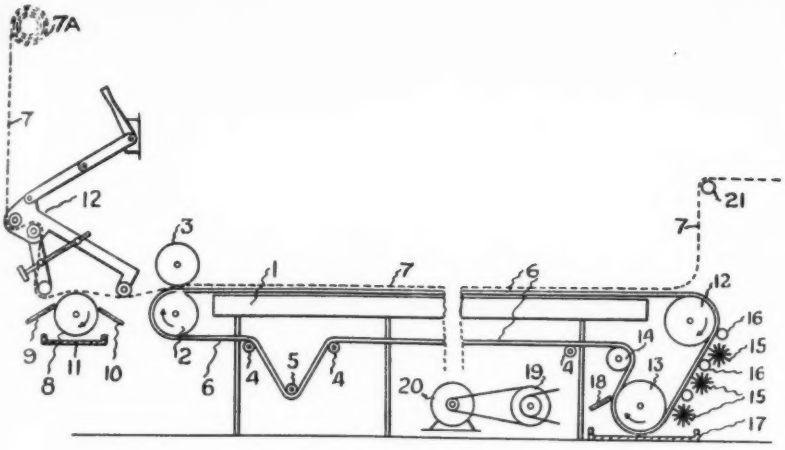

Figure 1

British Patent 646,172

(15, 16) before returning to the printing table.

It is claimed that the drying apparatus (not covered in this abstract), being separated from the printing table, does not obstruct the printing procedure. The entire apparatus consists, therefore, of a combination of the blanket washing device, the drying oven for the printed goods and the pasting device, which provides for gumming the fabric immediately before it contacts the blanket. An essential feature of this equipment may be seen in the tensioning device (Fig 2), which controls the amount of gum to be applied to the underside of fabric (7) by changing the arc of contact between the fabric and the gumming roller (8). It can be seen that by changing the position of lever (22) the contact with the roller (8) can be varied; additional pressure—see Fig 2A—can be exerted to increase the adhesion between fabric and blanket. Many details of methods equally suitable for regulating the operation, tensioning and adjusting of the pressure may be studied from the original specification. A drying device, used for the blanket after it leaves the washing machine, is not shown in the drawing; it may be assumed however that the blanket is fed to roller (3) in dry state before being used again.

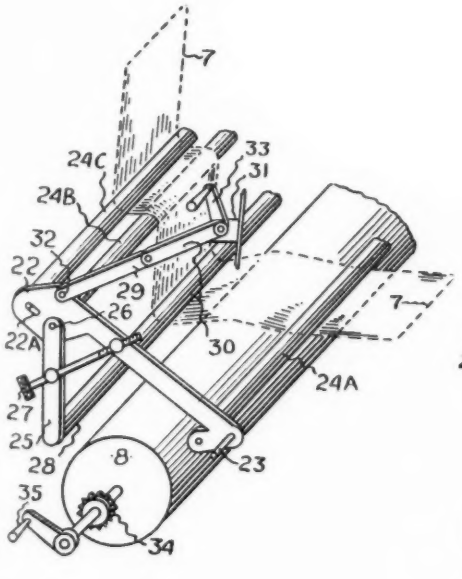

Figure 2

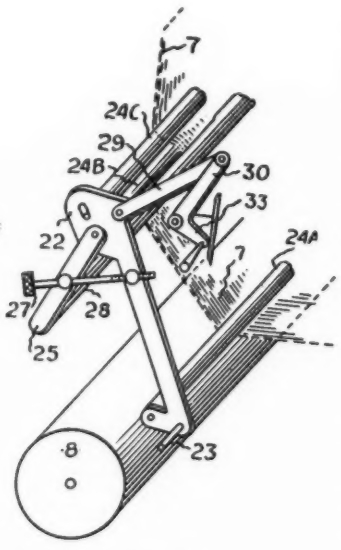

Figure 2A

British Patent 646,172

This unit is obviously a practical combination to make continuous printing operation possible. Among others, reference is made to the equipment patented by Leonard (Austrian Pat 140,492, Brit Pat 406,928 or French Pat 758,811), describing a similar pasting device for spraying an adhesive to the fabric and to the blanket immediately prior to their conveyance to the printing table. An innovation in the present invention is the regulating of the amount of this adhesive by varying the tension of the fabrics. Washing of the blankets after printing in a continuous operation has been suggested in roller printing operations (cf USP 2,080,133 of Rock Hill Printing Co or French Pat 819,163—Boeuf, etc).

RESIST PRINTING ON CHLORINATED WOOL—— Under Solubilized Phthalocyanine Dyes D, 2, 02

Brit P 646,690

(Imperial Chemical Industries—Thornton, Nov 29, 1950)

This patent refers to Brit P 587,131 (same company), describing the manufacture of phthalocyanine dyes solubilized by transforming them into soluble "Onium compounds." Another Brit P, 633,160, protects the application of alkaline reducing or acid mechanical resists before padding fabrics with these "Onium dyes" (cf the digest of this patent in *Am Dyestuff Reptr 39*, 389, 1950).

It has been observed that the resists recommended in Brit P 633,160 are not entirely suitable for use in printing chlorinated wool. Alkaline resist pastes have a deleterious effect on the fibers and acid containing resists impart a marked affinity for wool to the "onium compound," thus impairing the purity of the resist prints. A better solution of this problem has been found by replacing the alkaline reducing agents with acid-stable reducing compounds, eg, zinc-formaldehyde sulfoxylate combined with a mechanical resist, such as China Clay, plus an acid or acid liberating agent, such as citric acid or ammonium thiocyanate. A vat dyestuff may be incorporated in this resist to produce colored effects. Vat dyes are converted into the leuco or leuco acid state, having excellent affinity for the animal fibers. Optionally, dispersing agents and/or solvents may be added.

An example is given for a printing paste: 40% of a China Clay suspension (1:1), 41% of a Senegal gum thickener (50%), 3% urea (as a dispersant), 6% ammonium-thiocyanate and 10% soluble zinc formaldehyde sulfoxylate.

PRINTING NYLON WITH ACID OR DIRECT DYES—— Salts of Volatile Bases Added

D, 2, 07

Brit P 646,742

(Ciba Ltd—Nov 29, 1950)

Prints or dyeings on nylon are produced by applying dyes containing acid groups (preferably acid wool dyes but also various direct dye types), together with a salt of a volatile base and a less volatile acid or with heat decomposing esters that liberate acid upon steaming.

While the number of acid dyes suitable for this method is very large, comprising eg, Kiton dyes, Benzyl Green B Benzylviolet 5BN and so on, there are some restrictions in the series of direct dyes. The specification particularly mentions substantive dyestuffs of the benzidine group, which contains acid radicals, derivatives of 2-amino 5-oxynaphthalene 7-sulfonic acid, etc. Examples in this case are Direct Dark Green S, Direct Brown M and Direct Violet N.

The salts of volatile bases with less volatile acids are essentially restricted to compounds containing acid components, which do not affect the strength of the superpolyamide fibers. Typical examples of these agents are ammonium tartrate or ammonium thiocyanate.

An example is given of the composition of a printing paste. One of the forementioned dyes is mixed with resorcinol (as a solution promoter), dissolved in water and thickened with gum. Ammonium tartrate and a pine oil soap (as a wetting and dispersing agent) are added. The printed goods are steamed for an hour at 108° C at a pressure of ¼ atmosphere, rinsed and soaped at 40° C, rinsed again and dried. Level prints reportedly are obtained by this method.

Reference is made to former methods using, in general, ammonium salts of organic acids for fixing acid chrome dyes (eg, U S Pat 2,018,436 of Durand & Huguenin). This method obviously does not refer to nylon fibers. U S Pat 2,439,745 (Du Pont) (cf *Am Dyestuff Reptr* 37, 632, 1948) protects a process of dyeing or printing nylon with acid or direct dyes in the presence of a polyvalent acid salt of ammonium, such as ammonium sulfate, and adding caprolactam. The caprolactam has a dispersing effect on the dye and is used to overcome the tendency of ammonium sulfate (or phosphate) to precipitate the dyes by a rapid decomposition in steaming. It is interesting to note that in the present case this tendency of rapid decomposition can be avoided by using organic acids as mildly acting acid agents.

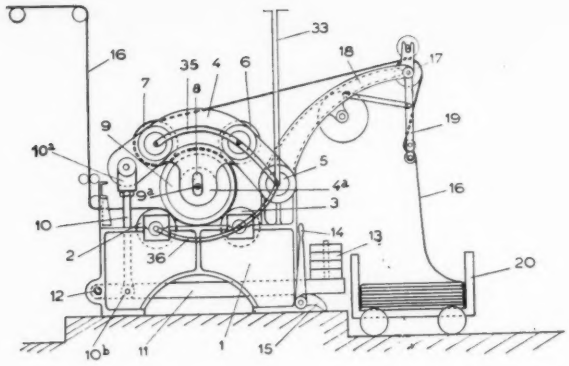

Figure 1

USP 2,533,724

CALENDER DRIVEN ROLLERS—Arranged Around a Non-driven Central Roller.

G, 4

U S Pat 2,533,724

(Dungler—Dec 12, 1950)

Known calender constructions are generally based on vertical or horizontal arrangements of alternating paper and metal rollers, which are difficult to remove from the supporting frame for cleaning or repairing purposes or for introducing the fabrics. The present device aims at simplifying the operations using two sets of rollers arranged around a central, non-driven roller (9). The lower set of rollers (2 and 3) is in a fixed position while the upper set (6 and 7), carried by arms (4), pivoting around spindle (5), can be lifted upwards to release the pressure and to introduce the fabric (16). Central roller (9) rests on rollers (2 and 3). With the lever (14) set to the position shown in the drawing, the arms (4) and thus the rollers (6 and 7) can be disengaged from (9). In the continuance of this movement the extension (4a) connected with (4) will lift axle (9a) of roller (9) to disengage this roller from the lower set (2 and 3). This is the position in which the fabrics can easily be introduced into the calender. Heating of the two sets of rollers is provided by pipes (35) and (36) respectively.

References cited by the Patent Office, among others:

U S Pat 1,659,708 (1928—Rumsch): a mangle, consisting of a central cylinder and pressure rollers placed around the cylinder with means for applying variable pressures. Means are provided for preventing escape of the heating steam without changing the pressure and position of the rollers.

U S Pat 1,565,348 (1925—Zeidler): applying pressure to the feed rolls of ironing machines during the ironing operation and quickly releasing and raising them when the machine is stopped.

DYEING CELLULOSE ACETATE and/or Vinyl Fabrics—Padding with Lactones.

C, 4, 07

U S Pat 2,535,098

(Monsanto Chemical Co—Shorey, Wright—Dec 26, 1950)

The preamble of this specification enumerates the methods used for dyeing cellulose esters or synthetic resin fabrics either by the application of specific dyestuffs or organic solvent solutions. Even in the latter case the immersion time is relatively long and difficulties have been experienced in recovering the expensive solvents. Moreover, the volatile solvents used in these methods cause formation of irritating, poisonous, flammable and explosive vapors.

The present method consists of a padding operation in which organic dyestuffs of different classes having an affinity to the fibers (basic, acid, mordant, metal complex dyes, etc) are dissolved in relatively high concentrations (from 2-35% by vol) of γ-valerolactone:

$$CH_3—CH—CH_2—CH_2—COO$$

or γ-butyrolactone. Addition of an organic acid such as acetic, citric or succinic and a cationactive agent either of the quaternary ammonium or of the Sapamine type is optional. The novel and unexpected effect obtained in applying these solutions is that optimum dyeing results are obtained within a very narrow temperature range (approximately between 26-30°C) and in an extremely short immersion time. With the use of a 30 per cent lactone concentration the absorption is complete within one second while about 50 seconds are required when a 2 per cent solution is employed. Obviously this method can be advantageously carried out in a continuous process. Immediately after immer-

(Concluded on Page 357)

Proceedings of the
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Secretary..ARTHUR S NYQUIST, American Cyanamid Co, Stamford, Conn
Vice-Chairman—OSCAR EDELSTEIN *Treasurer*—SOCRATES V VANIOTIS

Student Chapters

Bradford Durfee Technical Institute, Clemson College, Georgia Institute of Technology, Lowell Textile Institute, New Bedford Textile Institute, North Carolina State College, Philadelphia Textile Institute, Utica Technical Institute

Calendar of Future Meetings

COUNCIL: June 26 (Hotel New Yorker, N Y); Oct 18 (Hotel Statler, N Y); Nov 16 (Hotel New Yorker); Jan 18, 1952, April 18, 1952, June 20, 1952, Sept 19, 1952 (all in New York); Nov 6, 1952 (Boston).

GENERAL RESEARCH COMMITTEE: (Same dates and sites as Council).

NATIONAL CONVENTIONS: 1951—October 17-19, Hotel Statler, New York, N Y; 1952—November 6-8, Boston, Mass; 1953—Sept 17-19, Hotel Stevens, Chicago, Ill; 1954—Atlanta, Ga.

HUDSON-MOHAWK SECTION: June 22 (Annual Outing, Wolfert's Roost Country Club, Albany, N Y); Sept 21 (Jack's Restaurant, Albany); Oct 26 (Hotel Utica, Utica, N Y); Dec 7, Feb 1, 1952, Mar 21, 1952, May 2, 1952 (all at Jack's Restaurant); June 20, 1952 (Annual Outing).

MID-WEST SECTION: June 16 (Outing, Lake Lawn Lodge, Delavan, Wis); Sept 29 (Morrison Hotel, Chicago, Ill).

NEW YORK SECTION: June 15 (Outing, North Jersey C. C. Wayne Twsp, N J).

NORTHERN NEW ENGLAND SECTION: June 8 (Outing, Merrimac V C C, Methuen); Oct 26 (LTI, Lowell, Mass); Nov 30 (Annual Meeting, Boston, Mass).

PHILADELPHIA SECTION: June 1 (Outing, Torresdale-Frankford C C); Sept 14, Oct 26, Dec 7, Jan 18, 1952 (all at Kugler's Restaurant, Philadelphia).

PIEDMONT SECTION: June 29-30 (Outing, Myrtle Beach, S C); Sept 22 (Annual Meeting, Charlotte, N C).

RHODE ISLAND SECTION: June 22 (Outing, Wannamoisett C C); Oct 26 (Providence Engineering Society); Nov 16 (Johnson's).

SOUTH CENTRAL SECTION: August 24-25 (Outing); Dec 1 (Hotel Patten).

SOUTHEASTERN SECTION: June 8-9 (Outing, Radium Springs, Albany, Ga); Sept 8 (Columbus, Ga); Dec 8 (La Grange, Ga).

WESTERN NEW ENGLAND SECTION: June 22 (Outing).

ONE HUNDRED AND SIXTY-SIXTH GENERAL RESEARCH COMMITTEE MEETING

THE 166th meeting of the General Research Committee was held at North Carolina State College, Raleigh, North Carolina, Friday, April 20, 1951, the minutes of which follow:

Leonard S Little, Chairman of the General Research Committee, called the meeting to order at 1:45 p m and announced that this particular meeting was an open meeting. He reported that the Executive Committee on Research had met regularly each month this year and had given serious consideration to the General Research program of the Association.

"It is apparent that our research activities must be expanded if we are to discharge our responsibilities to the trade," Mr Little stated, "particularly since the increase in government procurement. That we are faced with limitations in personnel is recognized". Mr Little stated that the committees are all active and that the Drycleaning Committee had been reactivated because of the great increase in interest in this particular direction. As to the budget, it is reported that the Association has been spending from $36,000 to $38,000 per year, but the projected expansion in activities will make necessary next year a budget in the neighborhood of $60,000. Mr Little emphasized the fact that the various committees should consider seriously whether their test methods predict performance in end use and also solicited suggestions from members of the committee for the improvement of the work. The meeting was then turned over to Dr H W Stiegler, Director of Research.

Referring to the matter of space at Lowell Textile Institute, Dr Stiegler stated that the Association will be getting a large laboratory back that was lost some time ago. New equipment is coming in, including a laundry-wheel, a Hoffman press and a steam generator. The Hunter Small Color Difference Meter has been in use by Charles Seibert in his program and will be returned to Lowell. Dr Stiegler made reference to a recent talk given to the Massachusetts Laundry Owners Association during which he gave a report on the progress being made in AATCC wash fastness tests. He also stressed the importance of abrasion in considering the effects of laundering. Noting great interest on the part of the MLOA in our program, Dr Stiegler cited a need for similar collaboration with washing machine manufacturers. He reported that Inconel tubes for Wash Fastness Test III-A are available; that the Accelerotor will shortly be in production by Atlas Electric Devices and that the Federal Trade Commission had suggested a wool shrinkage specification which very obviously ignored work done by the AATCC. When this was called to their attention, it is reported that the Commission agreed to have a further meeting after considering our methods. Dr Stiegler has been invited to meetings of the ASTM Committees, D-12 on soap and detergents, and D-13 on textiles. At Lowell the research associates are still working on the washfastness program and studying at the same time, in the same program, dimensional changes; further, the dynamic dimensional change meter has been refined. As things are developing at Lowell, this group will probably be able to take on one or two more projects in the near future.

FASTNESS TO LIGHT———

M J Babey reported on the studies being made by Mr Seibert on methods of exposure to sunlight. Now that summer is approaching this program will be intensified by the exposure of further samples. Following this, Mr Babey referred to the work on the calibration of Fade-Ometer exposures which is being done in conjunction with the Bureau of Standards. The Steering Committee is considering other fibers which may be useful for calibration purposes. There was considerable discussion of anomalies, such as Mr Linberg's comments on the difference between Fade-Ometer and sunlight exposures on the new fibers like Dynel and Orlon. The committee recognizes that it has a big job to reconcile these differences.

WASH FASTNESS———

C A Sylvester pointed out that the goal of his committee is exemplified by the development of the recent III-A Wash Test. Referring to the fact that the Association may be developing too many wash tests and the desirability of consolidating them, Mr Sylvester referred to the work being done to develop methods for accelerated hand washing tests, the wool washing test (the work on which is being done by W F Brommelsiek's group), the work on a new accelerated II-A wash test, which is expected to equal the effect of five average moderate commercial launderings, such as are used in the laundering of manufactured fibers, and the development of a new IV-A accelerated test to equal five commercial launderings on such materials as shirtings, which will include the use of chlorine. Mr Sylvester then reported that, thus far, the efforts of his committee to use Munsell chips for evaluating tests have not been fruitful based on interlaboratory experience. He reported that 60 fabrics are now being tested by the New Jersey Laundry Owners' Association. These will furnish a basis for the development of accelerated laboratory tests.

W D Appel, in discussion, stated that the Europeans feel that the problem of evaluating tests can be simplified by reference only to a gray scale to show the steps of differences, but there was comment to the effect that previous attempts to relate color differences on a range of colors by reference to gray scales did not work. It was felt, however, that this approach should receive further consideration, since it is so often favored in European approaches to the problem.

T R Smith reported a difficulty in attempting to apply the III and II Wash Tests to copper-aftertreated colors in comparison with diazotized and developed colors. There appeared to be a switch in the relative value of these colors in the two tests. Mr Little expressed a doubt that we could hope to devise special tests for every particular situation and emphasized that the program was to develop a new series of wash tests, which would generally serve better to evaluate colors under the different general methods of laundering. J R Bonnar discussed the use of the acid sour and whether it is needed.

At this point G J Elkins presented a question on a dyeing problem that developed no positive answer from the group.

Subcommittee on Dimensional Changes———K H Barnard, reporting for J

(Concluded on Page P349)

General Technical Session——

THE ECONOMICS OF THE TEXTILE INDUSTRY*

D HARRY ANGNEY

Manager, Research and Statistics Federal Reserve Bank of Boston

The economics of the textile industry are basically no different from those of any industry, but at times we may think that they have more ramifications. Textile manufacturers and their suppliers are actively engaged in solving the basic economic problem of how to allocate scarce material and human resources to satisfy unlimited human needs.

Merchandising, or marketing, is the principal subdivision of this economic problem, according to those who stress the importance of anticipating and influencing consumer preferences. These enterprisers are constantly striving to capture a portion of the consumer market by developing new products and maintaining the quality of their established lines. They would like to have a protected market. High productivity or a low unit cost of production is the most important subdivision of the general economic problem in the opinion of the production man. He is interested in how fast he can effectively introduce new machinery into his plant, pay for it, and improve the quality of his products.

The assumption of risk by all business men—from the supplier of raw material to the retailer—coordinates both points of view and enables consumers to purchase products to satisfy their needs.

Competition still provides the checks and balances for the direction of the textile industry and its complementary and supplementary industries. The division of labor and specialized skills required to satisfy the myriad number of consumer preferences enable a large group of small enterprisers to contribute to total output. The paradox in the textile industry and its related fields of enterprise is that cooperation for stable conditions is required in a competitive framework which thrives on uncertainty and shifts in style and fashion.

It is more logical today to discuss the economics of the textile industry because fiber-blending, multiple-purpose machinery, and new finishes have broken down its traditional divisional lines. The textile industry has begun to encounter more intensive competition from substitute products.

Employment and payrolls are the economic issues for the community, which has assumed a new role in the structure of competitive industry.

The pervasive effect of price analysis extends the economics of the textile industry across the fields of agricultural policy, international trade, public finance, labor relations, corporation finance, marketing and other specialized economic subjects.

D Harry Angney

THE economics of the textile industry are basically no different from the economics of any other, but at times we may think that they have more ramifications because of the close association of many textile products with style and fashion. Textile manufacturers, those in related industries, businessmen in the supporting wholesale and retail trades and in financing institutions are actively engaged in solving the *basic economic problems* of how to use scarce material and human resources effectively in order to satisfy unlimited human needs. Textile mills are integral members of a larger team, which works together to satisfy consumer preferences expressed in terms of specifications and styles, as well as ability and willingness to pay the price.

Each and every stage in the flow of textile products from the raw material to the consumer is associated with every other stage in the flow sequence and with all other components in the general economic system. When raw materials or human effort are used for one purpose, they are not available for another use. If a dollar is spent for one product, it is not available at the same time for the purchase of another product, but, after it is spent, it again enters the income stream and someone else must make a decision to spend, save, or invest. One product competes with other products for the consumer's dollar and one investment opportunity competes with other investment opportunities for accumulated savings.

In the near future we will probably witness these basic economic forces in operation under controls and while more output flows to military uses, but my discussion this afternoon assumes that the individual consumer has the predominant position among alternative uses for textile-mill products. Of course, industrial use remains an important outlet for textile production under both assumptions. We have to cut into this dynamic interdependent economic structure somewhere, so we might as well begin our exploration at a point of central importance for all of the other operations in the textile industry.

The marketplace is the place or organized structure where buyers express their preferences, spend their money, and agree to take delivery of goods. Through the mechanism of the market an organized group of producers receives payment for its productive effort and assumption of risk. The market is the proving ground for fibers and fabrics, both old and new, and the many variations in finishes with which chemical research and finishing

* Presented before Twenty-ninth Annual Convention in Portsmouth, N H, on September 29, 1950.

techniques have changed the character of textile products.

Although chemical formulas are important for the determination and control of a specialized finish, they are not understood by the consumer. She or he buys in terms of price, experience, reliability, feel, appearance, and personal predilections. Consumers are not chemists or professional fabric testers. The variable nature of the consumer, exercised without restraint under freedom of choice, is a major unsettling but salutary force in the market for consumer goods fashioned from textile-mill products. It keeps competitors on their toes and directs productive effort.

To test the reaction of a small segment of the highly volatile women's apparel market I recently asked the buyer for a leading department store how he managed to keep up with the desirable qualities of the numerous new finishes developed for textile fabrics. He answered truthfully and simply by stating that he did not even try, but depended on the apparel manufacturer to make these decisions. This may be an exceptional case, but, if it is a common trait among buyers, then we have another indication of reliance on someone else to vouch for a satisfactory product. This assignment of confidence finally rests on you, a selling house, a converter, a raw material dealer, and the mill that produced the fabric. It emphasizes the need for basic research, especially by textile firms or their selling houses, in the field of consumption economics.

IMPORTANCE OF MERCHANDISING

The importance of anticipating and influencing consumer preferences causes many students of the textile industry to designate merchandising as its principal economic problem. Enterprisers have stepped up their efforts to corral a segment of the market for their products by special finishes, which resist fire, moths, wrinkles, creases, shrinkage, sunrot, water, mildew, stretch, heat, and cold. They have given brand names to these finishes and have actively sought customer acceptance by advertising in order to stabilize the demand for their particular products. Mills have designed special fabrics for individual retail outlets. In economic terminology these enterprisers have differentiated their products. Instead of an increase in the number of firms producing a single standardized product and selling principally on the basis of price, we have witnessed the growth of more individual firms, groups of firms, and integrated firms which sell individualized textile products with unique characteristics designed to set them apart from the general line of products in a given classification. To illustrate this development, I understand from a listing of this Association that there were 82 textile-finishing chemical trademarks and uses in 1939 and 712 in 1949.

Consideration must be given to limiting factors on these types of finishes. Before long the consumer may become sated and say "What the h---. Whom do they think they are fooling?" In addition, the economies of cost rears its ugly head in a period of high raw-material and labor cost. The consumer has had an opportunity to upgrade her purchase of textile products as disposable income per capita has risen, but she is still a creature of habit, has a price limit, and her preferences change slowly.

It is more logical today to talk about the economics of *"the"* textile industry because of fiber blending, multipurpose machinery, and potential substitution among yarns and fabrics. Chemistry and machine technology have bridged the gaps that formerly separated traditional manufacturing divisions in the textile industry, but have established new gaps that depend on varieties of finishes and substitutes, such as plastic film and improved paper products.

INVENTORY VOLATILE FACTOR

The economics of the textile industry are tightly entwined with general economic stability and the movement of prices. During the inventory recession of 1949 the cautious inventory policy of retailers and others who wished to avoid carrying high-priced inventory in the apparel market transmitted its effect back to the mills with a bang. On the other hand, the recent improvement in the general business situation and the unsettling effect of the Korean situation had the opposite effect. Everyone rushes in to buy in anticipation of a rise in prices and cuts his inventory to a bare minimum when he believes prices will decline. The emotional psychology of the market for textile-mill products intensifies the production problems at the mill level. The effect of inventory policies in textiles appears vividly when we compare the changes in the Federal Reserve Board's seasonally adjusted index of industrial production for textile-mill products with the general index of industrial production. From January to July 1949 the production index for textile-mill products dropped 25 per cent, and the general index of industrial production dropped only 16 per cent. From July 1949 to June 1950 the textile production index increased 44 per cent and the overall index of industrial production increased only 24 per cent.

The scarcity, quota and price-support programs for cotton and wool within the price structure of textile products have given a helping hand to synthetic fabrics as they have climbed up the ladder of consumer preference. In addition, the stability of prices in the field of synthetics has facilitated production planning, even though mills have had quotas of yarn. The economics of the textile industry must necessarily depend heavily on the prices and availability of its raw materials. I might mention here that the growth of synthetics has international economic and political significance in raw-wool-producing countries, such as Australia, New Zealand, Uruguay, and Argentina, as well as in a long-staple-cotton-producing country, such as Egypt. For example, during the 1949-1950 season it is estimated that the wool clip in Australia provided $645,000,000 in revenue, about $81 per capita.

The United States market for textile products has a strong attraction for textile manufacturers in foreign countries. A shortage of dollars has intensified their efforts to produce for the American market. The economics of the textile industry is thus related to the price and income structures of all textile-producing countries and to tariff negotiations.

PRODUCTION MAN'S POSITION

High productivity and a resultant low unit cost of production are the most important aspects of the economic problems of the textile industry in the opinion of the production man who is constantly encountering competition from firms producing similar or substitute products both at home and abroad. He is interested in how rapidly he can and must effectively install new machinery in his plant, pay for it, and improve the quality of his product. He knows that, unless he keeps costs at a minimum, some other producer will undersell him. He must rely on his own financial strength or on the assistance of those who are willing to advance funds which he invests in plant, machinery, operating supplies, and payroll before his final product sells in the market.

The higher and inflexible nature of basic-raw-material prices and wage costs in the production of products for a competitive market has increased the relative importance of product selection, taxes, power costs, transportation costs, rentals, and general overhead costs in the determination of net returns for a textile manufacturer. It has also stimulated the search

for efficient machinery. In textile manufacturing raw-material and labor costs comprise from approximately 75 per cent to 85 per cent of total costs for most types of products. When the prices and rates which largely determine this major segment of costs become frozen, the forces influencing other costs have greater importance. State and municipal tax policies and other nontax regulatory state laws thus have a greater effect on the location decisions and profit results of textile manufacturers. Management skill in developing, selecting, and merchandising products also has greater significance.

Some communities that have recognized the importance of employment and payrolls for their well-being have given a helping hand to textile manufacturers. The community has assumed a new role in the structure of competitive industry by the use of the industrial foundation to provide new plant space for lease, financial assistance, and management guidance. It has extended tangible assistance to manufacturers, who have in return agreed to locate and produce in the area.

RESPONSIBILITY TO THE COMMUNITY

A company must sell itself to the community in order to expect co-operation from the residents of the same community. No firm can operate continuously and successfully without maintaining and fostering self-respect and an individual feeling of accomplishment among its individual employees. This aspect of the economic problem is directly associated with the payment of wages and salaries and with the productivity of its employees. As an older industry, textile man ufacturing must strive harder to enable opportunities to exist for younger employees. Within the general economic system it shares the responsibility for those employees who have given years of their life and assumed economic risk in the industry.

The assumption of risk by all businessmen and employees—from the supplier of the raw material to the retailer—co-ordinates the production and sales points of view and enables consumers to purchase products to satisfy their needs. Textile manufacturing in the past has had a strong historical affiliation with the introduction of power-driven machinery and the factory system. It is belatedly in the process of a technological revolution in the middle of the twentieth century. As manufacturers and the trade generally make the necessary adjustments in machinery and products during the period of long-term transition, they are also confronted with seasonal forces, cyclical forces, and the demands of a war economy. The entrance and exit of firms continues as population grows and the market receives more potential consumers. Capable management survives but inefficient producers or those unwilling to continue production liquidate their mills.

The various divisions in textile manufacturing and related industries must adjust themselves to the different periods during the year when consumers buy apparel. The ratio of monthly dollar sales to total sales by departments for 1949 in Downtown Boston stores illustrates the degree of seasonality in selected items of apparel. About a third of men's clothing was sold in November and December and over a quarter in the three months of April, May, and June; over half of women's and misses' coat sales were made in the four months of March, April, October, and November; almost two-fifths of women's and misses' suits were sold in March and April and just over a fifth in September and October; slightly over a third of women's and misses' dresses left the racks in April, May, and June; and over a third of women's and misses' underwear, slips and negligees were purchased in November and December. Risk-taking to hit peak periods and gain consumer acceptance is standard operating procedure.

Competition still provides the checks and balances for the direction of the textile industry and its complementary and supplementary industries. Division of labor and specialized skills required to satisfy a myriad number of consumer preferences enables a large number of small enterprisers to contribute to total output. Although large firms provide leadership in the various divisions of the textile industry, there were 8,185 textile manufacturing establishments with 1,233,431 employees in the United States in 1947. In the apparel and related industries, there were 30,960 establishments with 1,081,844 employees. It still requires a considerable number of establishments and employees to produce what the consumer wants to buy.

INDUSTRY MOVES AHEAD

The economics of the textile industry requires a more intensive study of facts and a willingness to act on the basis of these facts. Merely because product selection, labor relations, sales, or financial policies have been in force during the past does not mean that they are the correct policies today. The textile industry with the help of supporting industries has severed its ties with the past more rapidly in recent years and has made rapid forward strides in the field of new products which sell at lower prices—the goal of any progressive industry. The industry will very likely produce more products with less employees in the future, and, consequently, cannot be counted on to provide an increasing number of jobs for a growing labor force.

The quest for stability in the textile industry will continue. The paradox in the textile industry and its related fields of enterprise is that co-operation for stable conditions is required in a competitive framework, which thrives on uncertainty and shifts in styles and fashions. Working conditions have improved with the development of technology, and from present indications the industry will continue to record these improvements.

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Piedmont Section Meeting Report

April 21, 1951

Sir Walter Hotel, Raleigh, N C

THE Spring Meeting of the Piedmont Section was held at Raleigh, N C, at the Sir Walter Hotel, April 21, 1951.

Members of the National Council and Research Committees also met in Raleigh on Thursday, April 19, 1951 at the Sir Walter Hotel and on Friday, April 20, 1951 at the School of Textiles, North Carolina State College. Members of these committees attended the section meeting on Saturday.

On Saturday morning the Piedmont Section Research Committee, of which H Y Jennings is *Chairman*, met at 10:30 A M at North Carolina State College, School of Textiles.

Open house was held at the School of Textiles from 9:00 A M to 3:00 P M on Saturday.

The Technical Session held on Saturday afternoon at 3:00 P M featured a presentation of contest papers by students from North Carolina State College, Clemson College and Georgia Institute of Technology. The winning paper was entitled "Textile Application of Infra-Red Photography" by C F Donyes, student of North Carolina State College.

Over two hundred (200) attended the Saturday evening banquet. W E Debnam, noted radio commentator, speaker and author, was guest speaker.

Announcement was made by National President Rabold that the 1951 Olney Medalist would be R W Jacoby of Ciba Company, Providence, Rhode Island.

Respectfully submitted,

M M McCANN,
Acting Secretary

Auxiliaries and Testing Group——

THE INTERRELATIONSHIP OF FUNCTIONAL FABRIC PROPERTIES RESULTING FROM THE USE OF SPECIAL TEXTILE FINISHES*

J FRED OESTERLING
Philadelphia Quartermaster Depot

1. The application of special textile finishes for the attainment of certain desired functional properties produces both primary and secondary fabric characteristics. For the purpose of this paper, these characteristics may be classified as follows:

(1) PRIMARY — Water resistance; fire resistance; mildew resistance; shrinkage control; resistance to chemical or photochemical degradation; crease resistance; and color or shade characteristics.

(2) SECONDARY — Breaking strength; tear strength; sewability; seam strength; hand; drape; flexibility at low temperatures; nontackiness; resistance to crocking; color fastness; resistance to perspiration; moisture-vapor permeability; durability of the finish to laundering; maintenance of strength characteristics during laundering; durability to leaching; stability to weathering; stability to aging or long-term storage; wear resistance; nontoxicity; and freedom from objectionable odors.

2. In general the attainment of any one of the primary characteristics through the application of special finishes would be a relatively simple matter were it not for the complicating effects produced on other primary and secondary characteristics. These concomitant effects of finishing treatments become of paramount importance in military fabrics where performance requirements are normally more rigorous than for civilian textiles.

3. The co-operative efforts of research laboratories, technologists and textile mills have gone far in attaining a good balance of those factors attendant on the production of satisfactory finishes. However, the ultimate goal of imparting, through the use of finishing treatments, specific functional characteristics to a base fabric without detracting materially from its inherent good qualities is yet to be reached.

4. A list of special finishing treatments for a variety of fabrics is presented with special attention given to those factors wherein improvement needs to be made.

J Fred Oesterling

INTRODUCTION

THE word finish may be defined as that which completes or perfects. Hence, textile finishes may be described as those treatments or processes, either physical or chemical, which have as their main objective the completion or perfection of a greige (base) fabric. Finishing processes may be divided into two very broad classes: (a) physical, which includes such operations as drying, singeing, tentering, napping, mechanical preshrinking, shearing, decatizing, calendering,—in short those operations which are principally mechanical in nature; and (b) chemical, which encompasses the application or deposition of chemical compounds on or within the fibers or fabrics, or the accomplishment of chemical reactions with the fiber itself. This discussion will be limited to a consideration of the latter (chemical) and will then include only a restricted segment of this field as it relates specifically to the functional properties of a few representative types of fabrics.

The use of finishes to impart new or improved characteristics to fabric dates back to antiquity. Dyeing with vegetable, animal, or mineral coloring matter was among the earliest of textile finishes. It has been reported that starch has been used as far back as 800 BC. According to Marsh (*1a*) "the earliest known methods of rendering textile fabrics impervious to water seem to have originated in primitive treatments with vegetable exudations, of which rubber latex is perhaps the most famous. . . . The oldest methods of European origin were based on linseed oil and date from the fourteenth century, but by the beginning of the nineteenth century treatments with aluminum soap had been discovered in England." Marsh (*1b*) further states that "The protection of inflammable material against fire dates back to 400 BC, but the earliest attempts to fireproof textile fabrics are of more recent date; about 1640, attention was drawn to the use of clay and plaster of Paris on canvas used in theaters. Alum was suggested in 1740 and ammonium phosphate in 1786."

The extensive commercial use of special finishing agents, however, to impart new and improved functional characteristics to fabrics without materially detracting from the base fabric's inherently desirable properties is of much more recent origin, having taken place essentially within the last 25 or 30 years. Durable water repellents, mildew inhibitors, fire retardants, shrinkage-resistant treatments for woolens, crease- or muss-resistant agents, mothicides, improved dyes and dyeing techniques, new softening agents, and antistatic compounds have come to the fore during this period. There are literally hundreds of finishing agents on the market today in addition to the thousands of ideas incorporated in the patent literature. One need turn only to the Section on Textile Chemical Specialties in the *1950 Technical Manual and Year Book* of the American Association of Textile Chemists and Colorists to find an imposing compilation of these products. The

* Presented at the Twenty-ninth Annual Convention, Portsmouth, N H, on September 30, 1950.

list available to the textile finisher increases daily.

DISCUSSION

PRIMARY AND SECONDARY FABRIC CHARACTERISTICS———The first requisite in the development of a special finish is that the compound or treatment imparts to the fabric the particular characteristic desired. A shrink-resistant treatment for wool must first impart shrinkage control to the treated fiber or fabric. This requirement having been met, other concomitant effects can be given consideration. These side effects more often than not so detract from the inherently desirable qualities of the fabric that the value of the primary objective (finish) is nullified. It is common experience that, when the ultimate in a particular textile property is achieved, other desirable characteristics suffer. For example, the best over-all results for shrink-resistant wool fabrics are not necessarily those in which the greatest degree of fabric stabilization has been attained. The merits of a fabric are dependent on the integration of many factors. In the case of wool the highest degree of shrinkage control, or even a satisfactory degree, may seriously affect the hand, drape, color (shade), alkali solubility, wear resistance and sewing quality or seam strength of the finished product.

It is possible to arrive at a better appreciation of the problems besetting the research worker, the producer of textile chemical specialties, and the textile finisher by listing the qualities frequently required or desired in a finished fabric, and by considering the interrelationship of one to another. First of all, in preparing such a list one is amazed at the multitude of fabric characteristics encountered. It also brings out a number of critical factors often overlooked. In Table I are listed a number of typical figures along with the required or desired characteristics. The figures in the column below the fabric and opposite a specific characteristic indicate the relative importance of the property. An arbitrary scale has been chosen in which the number one (1) is indicative of primary or major importance, two (2) secondary, and three (3) denotes that the property is of still lesser significance. A zero indicates inapplicability.

The application of special textile finishes for the attainment of certain desired functional properties may produce both primary and secondary fabric characteristics. For this paper, which deals principally with military fabrics, these characteristics have been classified as follows:

(1) *PRIMARY* — Water repellency; fire resistance; mildew resistance; shrinkage control; crease resistance; moth resistance; and color or shade characteristics.

(2) *SECONDARY* — Low add-on weight; breaking strength, tear strength, sewability; seam strength; resistance to yarn slippage; wear or abrasion resistance; handle; drape; moisture-vapor permeability; flexibility at low temperature; nontackiness; crock resistance; colorfastness to sunlight, laundering, and perspiration; stability to photochemical degradation; durability to laundering or dry cleaning; maintenance of strength after repeated launderings; durability to leaching; freedom from objectionable odor; nontoxicity; compatibility of finish with metallic findings; compatibility with other finishes; and stability to accelerated aging or long-term storage.

To this list of seven primary and twenty-five secondary characteristics others might be added. Secondary properties may become primary factors according to the particular objective for which the finish is applied. Not all characteristics are operative for any one fabric, the number being determined by the intended use of the end item.

The relative value of any factor may change in conformity with the end use. The ratings as presented in the table are not necessarily the values that are required specificationwise but represent the desired ideal. Quite frequently it is necessary to accept a working balance of the many factors involved.

INTER-RELATIONSHIP OF PRIMARY AND SECONDARY FACTORS ———An examination of Table I brings out a number of significant points. For the representative types of fabrics listed, low add-on weight, breaking strength, tear strength, sewability, seam strength, moisture-vapor permeability, compatibil-

TABLE I

FINISHING OBJECTIVES AND FABRIC CHARACTERISTICS

	CLOTHING FABRICS						TENTAGE FABRICS		
	Cloth, Cotton, Sateen, 9.0-oz OD 7 (Wind-Resistant, Water-Repellent)	Cloth, Cotton, Herringbone Twill, 8.5-oz OD 7 (Fire-Resistant, Water-Repellent)	Cloth, Wool Serge, 18-oz OD 33 (Moth-Resistant)	Cloth, Wool Flannel, 10½-oz Shrink-Resistant, OD 33	Sweaters, High Neck, Shrink-Resistant Treated	Undershirts, Winter M-50 Drawers, Winter M-50, OD 30.4	Cloth, Cotton, Wind-Resistant Twill, 5-oz OD 7	Cloth, Cotton Duck 12.29-oz, FWWR, OD 7	Cloth, Cotton, Sheeting 4-oz (Tent Liner)
	Relative Importance of Finished Fabric Characteristics*								
PRIMARY									
1. Water-Repellent	1	1	2	0	0	0	1	1	1
2. Fire-Resistant	0	1	0	0	0	0	1	1	1
3. Mildew-Resistant	0		0	0	0	0	1	1	1
4. Shrink-Resistant	1	1	2	1	1	1	1	2	1
5. Crease-Resistant	2	3	1	1	0	0	0	0	0
5. Moth-Resistant	0	0	1	1	1	1	0	0	0
7. Color (Shade)	1	1	1	1	2	3	2	2	3
SECONDARY									
(1) Low Add-on Weight	1	1	1	1	1	1	1	1	1
(2) Breaking Strength	1	1	1	1	1	1	1	1	1
(3) Tear Strength	1	1	1	1	0	0	1	1	1
(4) Sewability	1	1	1	1	1	1	1	1	1
(5) Seam Strength	1	1	1	1	1	1	1	1	1
(6) Resistance to Yarn Slippage	1	1	1	1	0	0	1	1	1
(7) Wear or Abrasion Resistance	1	1	1	1	1	2	2	2	2
(8) Hand	2	2	1	1	1	1	0	0	0
(9) Drape	1	2	1	1	2	3	0	0	0
(10) Moisture-Vapor Permeability	1	1	1	1	1	1	1	1	1
(11) Flexibility at Low Temperature	1	1	1	1	1	1	1	1	1
(12) Nontackiness	1	1	1	1	1	1	1	1	1
(13) Crock-Resistance	1	1	1	1	1	1	1	1	1
Colorfastness To:									
(14) Sunlight	1	1	1	1	2	3	1	1	
(15) Laundering	1	1	1	1	1	1	0	0	0
(16) Perspiration	1	1	1	1	1	1	0	0	0
(17) Stability to Photochemical Degradation	1	1	1	2	2	3	1	1	1
(18) Durability of finish to Laundering or Dry Cleaning	1	1	1	1	1	1	0	0	2
(19) Durability to Leaching	1	1	3	0	0	0	1	1	2
(20) Fabric strength after repeated Launderings	1	1	1	1	1	1	0	0	2
(21) Freedom from Objectionable Odor	1	1	1	1	1	1	2	2	2
(22) Nontoxicity	1	1	1	1	1	1	2	2	2
(23) Compatibility of Finish with Metallic Findings	1	1	1	1	0	0	1	1	1
(24) Compatibility with Other Finishes	1	1	1	1	1	1	1	1	1
(25) Stability to Accelerated Aging or Long-Term Storage	1	1	1	1	1	1	1	1	1

* 1 indicates primary importance; 2 secondary; 3 slight; and 0 not applicable.

ity with other finishes, and stability to accelerated aging or long-term storage are always of major importance.

The need for low add-on weight or attainment of minimum total weight, especially from a military standpoint, is self-evident. In general the same thing applies commercially, except in those instances where the primary objective is to impart to a very lightweight fabric the properties of a heavier fabric through the use of additives.

Breaking strength has, for years, been used as a criterion for measuring the effect of finishing treatments. Although a useful tool, it is now generally agreed among textile people that too much emphasis has been placed on this factor, while other characteristics have been overlooked. Greater attention needs to be given to tear strength, sewing characteristics, and the maintenance of fabric strength after repeated launderings, accelerated aging or outdoor exposure. The Quartermaster Research and Development Laboratories have found repeated launderings, where applicable, to be an excellent means of indicating potential post-treatment deterioration. This test has also been found to be useful in predicting deterioration in fire-resistant fabrics, which may occur when the fabric is subjected to cyclic leaching (or wetting) and drying in actual use.

Not infrequently the application of an additive to a given fabric results in an increase in breaking strength, although tear strength, sewing quality, and seam strength usually suffer. A decrease in breaking strength due to chemical or photochemical degradation of the fabric is normally accompanied by a decrease in tear strength. However, lowered breaking strength resulting from the use of a limited amount of softener-lubricant may be attended by an improvement in both tear strength and sewability, while yarn and/or fiber slippage tends to increase. These points are illustrated in Table II. Work at the Quartermaster Research and Development Laboratories indicates that there is a rather close relationship between tear strength, as affected by treatment, and sewability. Thus a decrease in the tear strength of a fabric after treatment has been found to be indicative of a deterioration in sewing quality.

Further evidence of the interrelationship of functional fabric properties may be found in treated wool fabrics. In the case of shrink-resistant-wool items, hand, drape, and color, all critical factors, may be affected. An unexpected difficulty has been experienced by the Quartermaster Research and Development Laboratories with seam slippage in the laundering of shrink-resistant tropical-worsted fabrics. One explanation advanced for this phenomenon is that the shrink-resistant properties of this lightweight loosely-woven cloth prevent the raw edges from matting or felting during laundering. Consequently there is a tendency for the shrink-resistant cloth to pull apart at the seams. The application of mothicides, especially from aqueous emulsion, has been found to reduce the natural water repellency of wool and to increase its wicking or water-absorption characteristics. It now appears that this deleterious effect may be overcome by combining the mothicide with a wax-type nondurable water-repellent emulsion.

While it is true that the application of special finishes to obtain specific functional characteristics is often attended by undesirable effects, it is also true that the accomplishment of certain desirable characteristics may be accompanied by the enhancement of other properties. A case in point is that of a fire-resistant fabric of which tear strength and sewability is markedly improved by application of a durable-type water repellent.

Many examples encompassing the entire list of functional characteristics in Table I might be cited of the concomitant effects of special finishing treatments. It is not the purpose of this paper to enumerate in great detail the interrelationship of functional fabric properties resulting from the use of special textile finishes. However, it is desired to call attention to the long list of characteristics that must be kept in mind in the development and application of special textile finishes. This is particularly true in the case of military fabrics where requirements are usually more rigorous than for civilian goods.

It is further suggested that in evaluating textile finishes more consideration be given tear strength and sewability along with other applicable factors. In this connection it is sincerely hoped that Table I or some comparable compilation of fabric characteristics will find use as a guide or check list to those who are interested in the development and application of textile finishes.

TABLE II

THE EFFECT OF SOME SPECIAL FINISHING TREATMENTS ON BREAKING STRENGTH, TEAR STRENGTH, AND SEWABILITY

Fabric	*Treatment*	*Breaking Strength lbs*		*Tear Strength (Elmendorf) Scale Readings*	*Sewability Seam Efficiency* Percent*
		Warp	*Filling*		
1. Cloth, Cotton, Broadcloth 3.2-oz, Khaki #1	Untreated	78	18	12.4	48.0
2. Cloth, Cotton, Broadcloth 3.2-oz, Khaki #1	Finish A	70	20	19.0	89.0
3. Cloth, Cotton, Broadcloth 3.2-oz, Khaki #1	Finish B	71	20	19.6	91.0
4. Cloth, Cotton, Uniform Twill, 8.2-oz, Khaki #1	Scoured, mercerized and dyed	..	127	50.9	49.5
5. Cloth, Cotton, Uniform Twill, 8.2-oz, Khaki #1	The same as 4, followed by treatment with a softening agent, framed and preshrunk	..	121	57.3	81.0
6. Cloth, Cotton, Broadcloth	Untreated	92	34	34.4	89.0
7. Cloth, Cotton, Broadcloth	Crease Resistant Treated	62	22	17.2	67.0

* Seam Efficiency $= \frac{\text{Strength of Seam}}{\text{Strength of Fabric}} \times 100$

CONCLUSION

IMPROVEMENT IN TEXTILE FINISHES———Much has been accomplished in the development of finishes for imparting to fibers or fabrics water repellency, fire resistance, mildew resistance, crease resistance, or even specific color characteristics or a combination of two or more of these factors. In general, an answer has been found for most of these functional properties where required. In some cases the treatments produce superior results, in others there is still much to be desired; the ultimate is yet to be reached in any case.

Water-repellent fabrics impermeable to rain and possessing the moisture-vapor permeability of an untreated fabric are still a goal. This problem is probably as much one of fabric construction as it is one of chemical finish.

During the past five years notable advances have been made in the development of durable fire-retardant treatments.

The problems which remain, however, in connection with lower add-on weight, color, flexibility at low temperatures, sewing quality, durability to leaching, outdoor exposure and especially laundering are such as to challenge the ingenuity and capabilities of our best research and technical men.

The perfect mildewcide or fungicidal treatment is yet to be found.

It is felt that shrinkage control in wool items has reached the stage where the major problems are largely ones of plant application and plant know-how. Hand and instability to aging in shrink-resistant wool continues as a factor in certain treatments.

On the basis of tests conducted by the Quartermaster Research and Development Laboratories a completely effective mothicide durable to laundering and dry cleaning is still a desired objective.

In conclusion it may be said that the co-operative efforts of research laboratories, technologists, and textile mills have gone far in attaining a good balance of those factors attendant on the production and application of satisfactory chemical finishes. However, the ultimate goal of imparting, through finishing treatments, specific functional characteristics to a greige (base) fabric without detracting from some of its inherent good qualities is yet to be reached.

REFERENCE

(1) Marsh, *An Introduction to Textile Finishing*, Chapman & Hall Ltd, London, England (1947); (1a) p 457, (1b) p 522.

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"Houghton Line" Salutes the AATCC

IN one of a series of descriptive articles giving the history and objectives of prominent trade associations, the AATCC is honored in the April 1951 issue of "The Houghton Line," a publication of E F Houghton & Company, Philadelphia. The article was prepared in close cooperation with the AATCC Publicity Committee headed by George Schuler, *Chairman.*

The "Line" states that "in the special field of textile wet processing, the last 25 years have seen technical advances which have revolutionized procedures, stabilized processes and improved immeasurably the quality and quantity of finished textiles available to meet the growing needs of the trade." They further point out that "assuredly it is not accidental that the period of most significant development coincides with the growth of the American Association of Textile Chemists and Colorists."

The illustrated article covers highlights of the Association's founding and history, brief sketches of its organizational structure and aims, and an outline of its current scope and future. Photographs include those taken at the 1950 Convention as well as recent portraits of current Association officers.

As a conclusion, Houghton "salutes the Association, and wishes its continued healthy growth."

—♦ ♦—

Research Committee Meeting

(Concluded from Page P342)

Warner, reported that recent government procurements have made the development of the wool shrinkage test an acute problem; the committee is at work on this problem. He stated that Mr Goodavage's hosiery committee has prepared its final report and has concluded that the most representative test is the one in Federal Specification CCC-T-191-A identified as the U S Army Accelerated Test. He also reported that the knit goods group is actively at work.

FLAMMABILITY——

H E Hager stated that the new method had been accepted at the last meeting, and that there has been general agreement on the work that has been reported including an interpretation of the results of the test. His committee will have in the forthcoming *Year Book* three classes which have been agreed upon:

(1) Safe fabrics which require more than 7 seconds to burn in the test equipment.

(2) Intermediate fabrics which burn between 4 and 7 seconds.

(3) Dangerous fabrics which burn in less than 4 seconds.

He stated that the committee now considers its work finished after five years of active effort, and asked that his committee be given reference status.

Dr Hager referred to the fact that the recent letter ballot on this flammability work brought out the fact that a 50% return is considered normal. Messrs Little and Stiegler amplified on this point and urged that recipients of postcard ballots make definite replies in all instances. If the recipient cannot feel qualified to vote, the card should be returned indicating that fact. It would also be appreciated if reasons would be given when the vote is negative.

Dr Stiegler advised that Atlas Electric Devices is making 12 of the latest Accelerotor models and will make them available for sale, probably within two months. They will be constructed of stainless steel with a container 5½ inches in diameter; the cost probably being in the neighborhood of $100. Dr Stiegler stated that J R Redmond's committee on Fire Resistance is still active and has suggested that their tentative method be given standard method status. He also stated that a mail ballot will probably be taken on this in the near future.

Mr Little inquired for suggestions from the group on improving these meetings. H G Scull replied that he would recommend a Committee on the Development of Odors from Resin Treated Material, stating that the British are working on this problem. K H Barnard replied that his committee is working on odor development and is seeking an accelerated test. A D Nute stated that the Committee on Resin Evaluation is continuing its study on crease resistance and is now including work on stiffness.

Mr Little thanked the University of North Carolina for its hospitality and entertainment during the two days of the meeting. He again requested that the committee members take their job seriously and give any constructive ideas to him which would help the Executive Committee on Research.

There being no further business the meeting adjourned at 3:08 p.m.

Those present included:

L S Little, *Chairman*
H W Stiegler, *Research Director*
G H Schuler, *Secretary*

W D Appel
E H Atwell
W L Barker
E B Bell
G R Bellamy
M J Babey
K H Barnard
J R Bonnar
K S Campbell
W C Carter
H C Chapin
H M Chase
R E Crowell
M A Dahlen
C W Dorn
C Z Draves
G J Elkins
A H Gaede
H E Hager
S L Hayes
A K Haynes
W A Holst
G H Hotte
G D Jackson, Jr
R W Jacobs
H Y Jennings
N A Johnson
J H Jones
H J Jordan
E R Kaswell
P J Kennedy
R G Lawrence
H W Leitch
G O Linberg
J Lindsay, Jr
W F Luther
A R Macormac
J B Neely
A D Nute
L C Reynolds
R E Rupp
H A Rutherford
H G Scull
H G Smith
T R Smith
R H Souther
R B Stehle
J A Stevenson
C A Sylvester
A F Tesi
P Theel
A R Thompson
F V Traut
S G Turnbull, Jr
N R Vieira
S H Williams
P J Wood
J A Woodruff
H L Young

New York Section——

PRESENT AND FUTURE DEVELOPMENTS IN THE DYEING AND FINISHING OF SYNTHETICS*

WILLIAM F BROSNAN

Esquire Processing Co. Bondsville, Mass

INTRODUCTION

LADIES and gentlemen, members and guests of the N Y section: It is a pleasure to be back with you. On two occasions in the past I have been a member of your section, and I recognize here tonight many friends from this area. One of my most esteemed friends is the genial chairman of your Program Committee, Jack Hennessey. Jack recently prevailed upon me to address you tonight on the general subject of developments in the dyeing and finishing of synthetics.

Coming to this section on such an assignment seems to me something akin to bringing coals to Newcastle. There are so many plants in this area doing excellent processing work on synthetics that it is asking the impossible to think that a Yankee can come here and startle such an audience with any revelations. I promise you that no miracles will be unveiled here tonight, but it is proper and fitting that we should pause and take inventory of the progress which has been and is being made in our industry.

We are now in the middle year of the 20th century. Fifty years ago the industry was ambling peacefully along, processing the centuries-old natural vegetable and animal fibers. Now in 1950 we have a galaxy of new man-made fibers. We have new machines, new processes, new dyes, new auxiliaries, new finishes, new fabrics and more new items to come. The most important result of the tremendous change is that it has bred a new species of dyers and finishers. It has made us think in a new fresh way. Experience with our new tools has been gained, and I shall attempt to give a limited resume of the practices which have evolved.

* Presented before the New York Section in Rochelle Park, N J, on October 13, 1950.

William F Brosnan

MACHINERY DEVELOPMENTS

First let us examine the developments in which the machinery builders have made it possible for our industry to surge forward.

The modern synthetics finishing plant is or will be equipped with all or some of the following items of modern machinery:

1) High-speed singeing machines using either refractory burners or improved pressure systems of line burners.
2) Embossing calenders for crepes and certain other constructions.
3) Continuous ranges for presetting and boiling-off goods preparatory to dyeing.
4) Dye becks of stainless steel, totally enclosed, fitted for continuous strand operation. New methods of dye distribution.
5) Heavier construction stainless-steel dye jigs, capable of handling larger batch rolls, fitted with practically indefinite tension controls, efficient expanders, separate high-speed drives for batching up completed rolls and stainless-steel enclosures of proven merit.
6) Heavy hydraulic microset and pneumatic pads, efficient for dyeing and/or finishing.
7) Continuous, open-width, tension-controlled ranges for dyeing and finishing.
8) Ranges for automatic opening, detwisting and extracting of rope-dyed fabrics.
9) High-speed tenters with overfeed devices and constant-tension batchers.
10) Improved tenter housings, slack dryers, predryers, curing units and heat-setting units.
11) Automatic and electronic devices for control of temperature, pressure, concentrations, tension, etc.
12) High-speed decatizers of greater batch capacity.
13) High speed calenders with motor-driven hydraulic accumulators, electronic seam and slub detectors.

The above listing is merely an attempt to hit the high spots, and in the time alloted will have to suffice. It is important, however, that credit should be given to our machine suppliers for developing these new and improved tools for us.

PROCESSING DEVELOPMENTS

I would like now to go into actual processing developments, which constitute the prime purpose of this talk. We will first consider wet processing and then finishing procedures for flat goods and rope-handled constructions.

Viscose and acetate fabrics form the greatest volume of yardage which is processed in the average plant. Nylon of course has grown in importance, as have

Fortisan, Celcos, Fiberglas, Vinyon and Saran. We will soon be confronted with Orlon, Dacron, Dynel, Vicara, Chemstrand and others in increasing volume. In general, most of the all-filament fabrics and some of the filament warp and spun-filled goods are handled in open width. Exceptions of course are crepe and plied-yarn constructions, which are rope dyed and spun rayon constructions which are also beck dyed.

DYEING OF VISCOSE FLAT GOODS ———Viscose twills, satins and taffeta-type fabrics are almost universally dyed by the pad-jig method. In many instances the padding is carried out on greige goods. This practice has become increasingly feasible with the decreased use of starch sizing by weavers. After being padded with direct colors, the goods are transferred to jigs where the color is set in a salt bath. Many of these flat fabrics are used for linings and dresses where the requirements are for fastness to dry cleaning and perspiration. Most direct colors are satisfactory in light and medium shades. Dark shades may be aftertreated with formaldehyde for improved fastness, or developed colors may be used.

Viscose shirtings are also being dyed both in flat and rope form with selected direct colors, which may be aftertreated with a copper-resin complex, such as Cuprofix, to produce dyeings of very good fastness to light and washing. The highest degree of fastness is obtained by use of vat colors. Short runs are handled by the pigment-pad-jig-reduction method, and longer runs are dyed continuously on such machines as the Williams unit or the pad-steam equipment. Pigment dyeing of shirtings, draperies, etc is practical in light and medium shades and is growing in favor with plants having suitable equipment for application.

DYEING OF ACETATE FLAT GOODS———Flat fabrics made of filament viscose with filament acetate are usually jig-dyed as are the 100%-filament-acetate constructions. The jig coloring of viscose is relatively simple, but the jig dyeing of acetate introduces more problems. We know that direct dyes have a definite affinity for viscose, and dark colors can be built up by the addition of salt. When we consider the dyeing of acetates we are really dealing with a horse of a different color. We know that the jig dyeing of light-weight acetate fabrics in light colors and black usually produce good results. However, when we come to mode shades of medium and dark depths, we run into difficulties in side-to-side and end-to-end shading. This means excessive seconds and cut-offs which are profitable to neither the dyer nor the customer.

In the dyeing of acetate we must remember that an entirely different action is taking place than in the dyeing of viscose. In the case of acetate, the dyes used are not truly soluble in the dyebath, but are, in contrast, present as finely dispersed particles. These color dispersions are actually dissolved by the acetate and form a solid solution of color in the acetate fiber. Further, the dyeing of the acetate is greatly affected by bath conditions, temperature and time. Different dyes vary greatly in their behavior under variations in these conditions. Again, some acetate colors build up well under a given set of conditions when used alone, but in combination with other acetate dyes they may be blocked out and remain to a greater extent in the dispersed state in the dye bath.

We know that gas fading is a serious defect of many dyed acetate fabrics. Particularly troublesome are shades containing blue, and, with the exception of yellows and scarlets, practically every dyeing will contain some blue element or component. There are available to dyers the more common anthraquinone blues and the newer blues, which are azo derivatives. The anthraquinone blues are fairly level dyeing in open jigs, but they are very susceptible to gas fading. The azo blues can only be dyed level at high temperatures in closed jigs, and they do exhibit much better gas fastness but inferior light fastness. The gas fastness of the acetate colors can be improved by the use of certain amines, which are applied preliminary to the addition of the dyes to the bath. Now logically the end use of the fabric determines which type of blue should be used. For linings the azo blues are definitely prescribed since gas fastness is of prime importance and light fastness is secondary. For suitings, draperies, etc, the light fastness and level dyeing are probably as important as the gas fastness. Therefore the anthraquinone blues with amine inhibitors are indicated as the best choice. Combining both types may be satisfactory in becks, but in jig dyeing it leads to bad selvedge shading unless the dyeing is carried out in an enclosed machine with careful attention to temperature. Naturally, 300-, 450- and 600-denier acetate is more difficult to dye successfully than is the 75- or 150-denier.

The best practice for jig dyeing any heavy acetate construction is to use a permanent antifume, and to dye in covered machines. We know that more dyeing action goes on on the batch roll than in the few seconds of passage of fabric through the jig liquor. An open jig allows the batch roll to cool down along the edges, and it takes only a few degrees difference in temperature to cause uneven dyeing. It follows that the best results are obtained when the acetate fabric is processed in enclosed jigs. Acetate fabrics may also be dyed with acid colors. The preferred procedure consists of using a dye bath containing a material which will have swelling action on the acetate fiber such as alcohol or di-acetone alcohol. Another recent development is the vat dyeing of acetate where the swelling agent or dyeing assistant used consists of tannic acid with a phenol-sulfur complex.

DYEING OF NYLON FLAT GOODS ———Filament-nylon fabrics are also suitable for dyeing in jigs. For regular work of moderate fastness the best results are obtained when the dispersed acetate colors are used. The comments made in connection with the jig dyeing of acetate hold true also for nylon. Enclosed jigs are of importance for obtaining well-penetrated level-dyed pieces. In the case of nylon, heat setting is of course of major importance. After a fabric has been heat-set at elevated temperautre, the nylon is satisfactorily dyed at or near the boil with acetate colors.

Nylon may also be dyed with direct, acid, chrome and metalized dyes, naphthols and vats. These colors, while generally faster than acetate colors, are not as level dyeing, and they usually accentuate warp streaks in the highly oriented nylon fiber. They also do not build up well. One successful method of utilizing acid and chrome colors is to pad the nylon fabric with an alkaline solution of the dyestuff; then dry and steam the goods to fix the colors and subsequently treat the fabric with acid or *chrome and acid* on a jig to complete the dyeing. More recently it has been suggested that nylon flat goods may be dyed with acid and direct colors on a pad-steam range. In this case gums and solvents are used in the pad liquor to increase dye solubility and build up.

Vat colors may be dyed on nylon, but high-temperature reductions are required and the build-up is poor. The fastness of vats on nylon is greatly inferior to their fastness on cotton and viscose. In this regard the yellows, oranges, reds and browns are inferior to the other shades in the spectrum.

A limited range of fast colors can be dyed on both acetate and nylon by the use of naphthols. In this process the fabric is treated with the naphthol and an assistant. After the naphthol has been absorbed, a fast color base is added. The base is then diazotized and developed in a fresh bath.

The Du Pont Company has recently produced a new range of dyestuffs for nylon under the name of Neutracyls. They are applied from a neutral bath and have good dyeing and fastness properties on nylon and wool. The advantage of the Neutracyls over the acid or chrome colors is apparent as the possibility of tendering action from the use of sulfuric acid is eliminated.

DYEING OF OTHER FIBERS——— Orlon acrylic fiber is more difficult to dye than nylon. Ordinary dyeings at 205 to 212° F produce only light and pastel shades with the dispersed acetate dyes. Improved absorption of acetate dyes may be obtained by the use of an assistant, such as phenol, in the dyebath. Orlon may also be dyed in light-fast pastel shades with soluble vat dyes. In this process the orlon is padded with dyestuff and sodium nitrite and then developed with hydroxyacetic acid. Thioindigoid vat colors show some affinity for orlon when dyed at 212° F. It is quite likely that pressure dyeing will prove to be the best method of dyeing orlon.

Dacron is still in the experimental stages, but the Du Pont Company has reported that it can best be dyed with dispersed acetate colors. It is likely that developments in the dyeing of Dacron, Orlon and nylon will be greatest when suitable pressure-dyeing machines are available so that temperatures in the neighborhood of 250° F can be employed. This observation, I believe, will hold true for these or any hydrophobic fibers of the same general type.

The Thermosol process for dyeing these fibers has been developed by the Du Pont Company. Briefly, it consists of padding the fabric with suitable dyestuff, drying, and then heat-treating at 400° F. In this procedure the dyeing is actually a function of the high temperature treatment.

Dynel is the name of Carbide's new fiber. For the dyeing of Dynel, acetate and acid colors are recommended. They should be applied with a swelling agent such as para-phenylphenol copper salts.

Fiberglass will probably become more popular as a result of the application of the coronizing process developed by Owens Corning Company. In this process the fiber-glass fabrics are greatly enhanced in such properties as softness, drape and dye receptiveness by subjecting the fabric to a temperature of 1200° F. Pigment colors are being applied to fiber-glass fabrics quite successfully.

In the protein fiber field we have Vicara, the new development of the Virginia Carolina Company. Vicara has affinity for most dyes and the wool colors are widely used for dyeing this fiber.

ROPE HANDLING OF SYNTHETIC FABRICS———I have discussed the dyeing of various synthetics primarily in the filament form because I believe that in this form the greatest difficulties are met. Any or all of these fibers are more receptive to dyes and chemicals in the form of staple or raw stock. Consequently I consider the beck dyeing of synthetics to be less troublesome than pad, jig or continuous-machine methods. Beck dyeing in general is recommended whenever a fabric is so constructed, either of filament or spun yarns or mixtures of both, that it can be satisfactorily run in rope form without the formation of break marks.

The formation of break marks can be guarded against in several ways. Fabrics, particularly those containing acetate filament yarns, can be embossed in the greige to break up the surface and disguise break marks if they should occur during the subsequent rope handling. Again fabrics containing filament acetate or nylon can be preset in open width at a higher temperature than they will encounter during subsequent dyeing operations. Still another precaution against break marks in rope processing is to use a well-lubricated, slightly alkaline dyebath and to dye at as low a temperature as is practical. I also believe that, for some of the heavier constructions containing filament acetate, the old-type wooden dye becks are superior to the newer stainless-steel machines for the avoidance of shiners and rub marks. As a final comment on the beck dyeing I would assert my opinion that more streaky work is produced by overcrowding becks than is generally realized.

PROCESSING AUXILIARIES ——— Before proceeding to the finishing operations, I believe it is in order to say a few words regarding the auxiliaries available to us as detergents, wetting agents, dispersers and softeners. In general, we have available anionic, cationic, and nonionic products. The list is imposing, and among the anion-active materials we have soaps, sulfonated oils, alkyl sulfates (Gardinol), alkyl sulfonates (Mersolates), alkyl esters (Igepon A), alkyl amides (Igepon T), alkylaryl sulfonates (Naccanol), etc, etc. The predominant nonionic materials are polyethylene compounds (Igepal, Peregal). The most important cationic materials are quaternary ammonium compounds (Lissolamines, Onyxsans). It is a smart dyer who is able to determine the best one to use from the imposing array that is available. For general dyebath and scouring use, the anionic products are recommended. Many of them are rewetting agents and aid in subsequent finishing operations. Many are remarkably stable to hard water, alkali and acid conditions. For special work, such as the processing of fabrics which are to be water-repelled, or where mark-off or crocking is a factor, the use of nonionics is recommended. When cationics are used as softeners, it is wise to select dyestuffs whose light fastness is least affected by such materials. A cardinal rule is to use the minimum concentration that will suffice for the job at hand. Double the optimum amount does not do twice as good a job.

FINISHING OF SYNTHETICS

The finishing of filament rayons does not present many problems. They can be satisfactorily processed on dry cans, tenters, palmers, or calenders with little or no difficulty. A well-dyed fabric of this type usually results in a well-finished fabric.

With spun rayons and blends, however, a serious finishing problem exists. Without attempting to moralize, I believe that in the past more spun-rayon fabrics have been *degraded* by *careless* or *indifferent* finishing procedures than by any other means. It is a *miracle* that spun rayons ever survived the *abuse* they received at the hands of the finishers. Fortunately we have come to realize that these synthetics must be handled carefully, that tension must be kept at a minimum and that special chemical treatments must be used to produce an economically sound and functionally desirable finished fabric. It is hoped that our clients have come to appreciate that quality can be built into synthetics if they will pay the costs.

Without a doubt, the discovery of the anticrease process by Tootal, Broadhurst and Lee is the most important discovery yet made in connection with the finishing of spun-viscose fabrics. Practically all fabrics containing viscose staple yarns are now finished with resins of one kind or another. The application of urea- and melamine-formaldehyde resins are so well known to all that they require little special comment. The newest trend in the application of the unpolymerized forms of these resins is the use of new organic catalysts. It is possible that a suitable catalyst may soon be available which will effect the polymerization of the resin monomers satisfactorily without the need of washing the fabric subsequent to curing. For the present, however, it is still good practice to wash so as to remove traces of unfixed resin and to eliminate danger of odor development.

Fabric stabilization is also being secured by the application of ketone-aldehyde resins, by the glyoxal process of Sanforset

and by the use of Ceglin in combination with alkali and formaldehyde. This latter process is confined largely to vat-dyed viscose fabrics.

A new trend in resin finishing is the use of the acid colloid of melamine-formaldehyde resins. In this procedure the resin solution is treated with a suitable acid, such as lactic, acetic or hydroxyacetic acid, and is allowed to stand until the reaction converts the melamine to a colloidal form, which is a partially polymerized melamine resin. The acid colloid is padded onto the fabric and dried at a high temperature. No further curing is required and, if edible lactic acid is used, even the washing may be eliminated. It is claimed that excellent stabilization can be obtained by this process. Another interesting feature of the acid colloid is that it is compatible with certain wax emulsions, which when used together, produce quite durable water-repellent resin finishes on fabrics. The finish produced is desirable for outerwear, raincoats, and other rain-resistant articles.

OTHER SPECIAL FINISHES

Other repellents known to all of us include the durable types such as zelan, norane and permel. With special techniques, they may be combined with resins. They all require careful attention to drying temperatures, high-temperature curing and subsequent washing. Among the nondurable repellents are the aluminum-wax combinations and the more durable zirconium-wax combinations. These latter types cannot be used with urea-formaldehyde or melamine resins. If they are applied over a resin-treated fabric, objectionable fishy odors are almost certain to develop.

Research with silicone repellents indicates that they may soon become an important factor in this category.

The newest special finish to appear on the horizon is the product known as milium. It is reported to consist of finely dispersed aluminum, which, when deposited on a fabric, produces a sensation of warmth without weight. Its first important use is expected to be in the treatment of lining fabrics where its insulating properties can be well appreciated.

An important combination of mechanical- and chemical-finishing technique is furnished by Bancroft's Everglaze process. Considerable yardages of synthetics have been run by this patented process, which consists of embossing resin-impregnated fabrics. After subsequent curing, the embossed effect is quite durable. Many interesting wash-fast patterns and effects are produced by finishers licensed to employ this process.

In the use of any or all of these finishing processes it is important that careful attention be given to their effect upon such properties as tensile strength, chlorine retention, color fastness, yellowing effect and cost. Usually the end use of a fabric will dictate what procedures are to be employed. Too often the price per yard, rather than serviceability, is the deciding factor.

SUMMARY

In closing, I would like to summarize that progress has been made in machinery design and fabrication. Progress has been made in the chemical field of dyestuffs, detergents, finishes and specialties. Progress has been made in the field of fibers and fabrics. I also wish to add that progress has been made in the training and education of men and women to specialize in our chosen field of endeavor. We have a fresh industry, able to cope with developments in allied fields and to come up with the right answers to the best methods and techniques of processing synthetics so as to enhance their value to mankind. We are only on the threshold of great vistas of progress to come.

DISCUSSION

Question: You have discussed briefly the padding of acetate fabrics. Would you go a little further and tell us if there are any new developments in that field?

Answer: The padding of regular acetate dyestuffs on acetate underwear and other materials for light colors constitutes no problem. For the dyeing of a full range of deep shades continuously, selected acid colors may be employed, along with a swelling agent, such as an alcohol solvent. The process is a sort of sudden-death affair in which the exposure to the solvent must be very short, probably for seven or eight seconds. The dyed fabric must then be washed promptly so as to stop the action and avoid tendering. I have run dyeings that way on a range consisting of two Williams units and three wash boxes in tandem. Such dyeing is not practical costwise, however, and dark shades have a tendency to crock.

With respect to the application of vat colors to acetate, the use of tannic acid and a phenol-sulfur combination gives prospects of working best. Acetate and viscose rayon blends have been dyed quite successfully by the procedure. Application by this method is quicker and easier on a continuous range than in a jig or dye beck.

Q: Did you say that a lubricant can be used to prevent breaks and shines in the beck dyeing of acetates.

A: Not to stop them but to minimize them.

Q: What lubricant?

A: A good sulfonated oil is best; soap has the disadvantage of tending to cause the precipitation of lime soaps in the goods, especially when the water is somewhat hard.

Q: Is it true that the Vat-Craft process can be used for the application of vat dyes on acetate materials.

A: I do not know if such claims are justified. Apparently the Vat-Craft dyeing process has been returned to research and is not ready for exploitation.

EDITOR'S NOTE: The paper relative to the Vat-Craft procedure presented before the New York and Southeastern Sections was not published because it did not disclose the chemical reactions on which its remarkable claims were based.

EMPLOYMENT REGISTER

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association. Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the Secretary.

51-6

Education: S B, Massachusetts Institute of Technology.

Experience: Laboratory, textile chemistry, microbiology, bacteriology, manufacturing quality control and development.

Age: 58; married, references; location in New England desired.

5-28, 6-11

51-7

Education: M A, textiles, clothing, business administration & marketing.

Experience: teacher and research assistant.

Age: 34; woman; single; executive or research position desired, location immaterial.

5-28, 6-11

30th NATIONAL CONVENTION AND EXPOSITION

Hotel Statler, New York
OCTOBER 17-18-19

Auspices of
NEW YORK SECTION

Exposition Under Management of
CAMPBELL-FAIRBANKS, INC.

Piedmont Section——

DYEING OF ALGOSOLS ON HOSIERY*

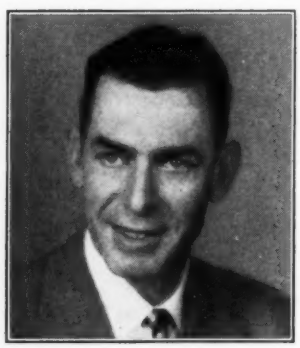
K A BRIDGES

General Dyestuff Corporation

INTRODUCTION

ALGOSOLS are the easy way to vat-color fastness. These colors, also marketed as Indigosols and under several other trade names, are the leucoesters of vat dyestuffs. The water-insoluble vat dyestuff is transformed by sulfation of the leuco compound (or an analagous procedure) to an ester of sulfuric acid, and in this form becomes a water-soluble product. These leucoesters are fast only after being developed on the fibers to the original vat dyestuff by the action of oxidizing agents in the presence of acid. Each Algosol is similar in shade and fastness to its parent vat color. It is to be observed that both anthraquinone and indigoid types of vat dyes have been converted to Algosols.

This group of water-soluble vat dyes found a place in the production of certain light shades on cotton and cotton-rayon hose several years ago, and their use in the hosiery industry has steadily increased. When there first became a demand for colors possessing good all-round fastness, especially to washing, on men's hose and women's and children's anklets, vat colors of the Indanthrene type were used for the production of all fast-color shades. Although the majority of Indanthrene, or reduced-dyeing, vat colors produce satisfactory results in medium and heavy shades on hosiery, some types do not level or penetrate well in light shades. The Algosols, on the other hand, have less affinity for cellulosic fibers and exhaust much more slowly on these fibers than do the water-insoluble vat colors. The good leveling and penetrating qualities of the Algosols, even in light shades on tightly twisted and tightly knitted yarns, are attributed to their moderate affinity and slow exhaustion. Excellent duplication of shade on successive dyeings is also obtained with these products.



K A Bridges

In the dyeing of fast colors on cotton and/or rayon hosiery, especially when light bright shades are required, the leucoesters of vat dyes were declared by the speaker to be not only more economical in the total application cost in spite of greater dyestuff cost but to give better penetration and levelness. For solid medium and heavy shades, for which dyestuff cost becomes more important and penetration is easier, conventional reduced vat dyes will continue to be used. Where deeply colored wash-fast yarn-dyed clocks or white acetate decorations that would be ruined in a reduced vat are required, however, leucoesters are necessary for even fairly heavy as well as light shades on the hose because they do not stain the acetate and light overdyeing on the deep colors of the cotton or rayon clocks is tolerable.

The working properties of leucoesters are discussed and a typical application procedure for hosiery is given in detail. The importance of good stainless steel for avoidance of corrosion from nitrous acid is emphasized.

ADVANTAGES OF ALGOSOLS

COST———The cost of light shades of Algosols is less than that of their parent vat colors, although the cost per pound of the Algosol dyestuff is higher than that of the corresponding vat dyestuff. In arriving at the final dyeing cost of a desired shade, the necessary chemicals for the application of each of these types of colors must be considered. Only small quantities of sodium nitrite and sulfuric acid are necessary in the application of the Algosols to cellulosic fibers, while, in the application of vat colors to the same fibers, large quantities of caustic soda and expensive sodium hydrosulfite are required. The large quantity of hydrosulfite, 10 to 12% on the weight of the fibers, required in applying vat colors on hosiery-dyeing equipment runs the total color and chemical cost of vats up higher than that of the Algosols. The saving thus effected by the use of Algosols instead of vats depends on the color combinations and the liquor ratio of the machine in use, but usually is from 0.5c to 1.5c per pound of hose.

BRIGHT SHADES———Most production on hosiery, especially on anklets, with the water-soluble vats is on a bleached bottom for obtaining the brightest possible shades. When Algosol Red IFBB is used as a self shade for the production of pinks, however, the brightest results are obtained if chlorine bleaching follows dyeing. The other Algosols may also be bleached after dyeing, with the exception of two of the indigoid types, namely, Algosols Blue 04B and Blue 06B. These two indigoid dyestuffs are not so fast to either chlorine or peroxide bleaching as are other indigoid types or as are the anthraquinone types.

UNIONS———Unions on hose composed of mercerized cotton heel and toe and rayon body are not easily produced, but are possible by a selection of colors. The best unions obtainable in the production of blue shades, for instance, are with a combination of Algosols Blue 06B, Green IBW, and Brilliant Violet 14R. Such a combination of colors so far apart in self shades would not be advisable with other classes of dyes. The Algosols in this type of combination, however, produce very satisfactory results in practice because of their excellent dyeing and leveling characteristics. Algosol Blue 04B, generally

* Presented before Piedmont Section in Charlotte, N C, on Oct 28, 1950.

used for the production of blues on 100% cotton, is unsatisfactory for unions as rayon is dyed much redder and slightly heavier than mercerized cotton by this color when the two fibers are dyed in the same bath. The perfection of the union depends to a large degree on the type of rayon being used. The different brands or manufactures of rayon, as well as dull, semidull and bright rayon of the same brand, show a slightly different color reflection in both cast and depth. The best Algosol unions have been produced on dull rayon when it was knitted alongside mercerized cotton. Nylon is dyed lighter shades with the Algosols than either cotton or rayon. However, this fiber is colored sufficiently with these colors to permit their use on hose having a cotton heel and toe reinforced with nylon.

DECORATIONS IN HOSIERY——— Algosols have a definite advantage, as can be seen in these samples (displayed at the lecture), in light shades on hose and anklets containing colored decorations or white acetate decorations that are to be left clear. Neither these colors nor their necessary chemicals have any stripping action on the colored decorations, and they do not dye acetate. The chemicals necessary with the water-insoluble vat colors, however, do tend to strip colored decorations, and the vats themselves stain acetate heavily during the dyeing operation. It is true that the decorations other than those of acetate or the best resisted yarns, are overdyed with Algosols, but the shades are so light that in most cases the change in shade of the decorations is negligible.

WORKING PROPERTIES

SOLUBILITY ——— Since the leucoesters of vat dyestuffs are easily dissolved in hot water, it is not necessary to boil them. Boiling water or live steam should not come in contact with the dyestuff as either might cause premature oxidation. These colors, whether paste or powder, are first pasted with hot water previously heated to 170°F, and then additional hot water is added. Agitation now brings about complete solution.

STABILITY———The stability of Algosols is entirely satisfactory for their application to cellulosic fibers on all types of dyeing equipment. Although these colors are standardized with alkaline salts to form relatively stable salts of leucoesters, their stability may be improved even more by the addition of a small amount of alkali to the dyebath, such as 4 ounces of caustic soda or 12 ounces of soda ash per 100 gallons. The addition of alkali is especially beneficial with Algosols Blue IBC, Green IBW, Olive Green IB and Golden Orange IRR. However, the stability of Algosols without the addition of alkali to the dyebath is sufficient for their practical use on hosiery equipment during the short dyeing time of 30 to 35 minutes at low temperature.

AFFINITY ——— Dyeing temperature affects considerably the affinity of these water-soluble vat colors for cellulosic fibers. Affinity is increased with low temperatures and decreased with high temperatures. To obtain the best color economy, dyeing is carried out at the lowest temperatures suitable for good machine circulation and for wetting the fibers in process. The affinity of the Algosols is less than that of the other classes of colors. Yet affinity is increased sufficiently by low-dyeing temperatures and by the addition of salt to the dyebath to make practical the production of light shades with Algosols on hosiery. This is true even though most hosiery-dyeing equipment has a long liquor ratio. One exception is Algosol Blue IBC, the affinity of which is not increased enough by lowering of the dyeing temperature and by the use of salt for good exhaustion and good color value. The Blue IBC, which is entirely different chemically from the other colors of this group, requires acetic acid in addition to salt to increase its affinity sufficiently for practical use. The amount of acid necessary for good affinity depends on depth of shade. Light shades require from one-half to one pint of 56% acetic acid per 100 gallons of dyebath. It is the practice in the hosiery dyehouse to use acetic acid only in the dyeing the Blue IBC, as good color value results from the use of only salt for exhaustion of the other dyestuffs of this group in the production of light shades.

SENSITIVITY TO OXIDATION ———The Algosols are sensitive to oxidation by the action of both light and acid fumes before complete chemical development of the shade. They should not be exposed, previous to development, to any bright or uneven light or to any acid fumes. Such exposure of the dyestuff on the fiber may result in streaky or uneven shades. The indigoid types, such as Algosols Blue O4B and Pink IR Fine, are even more susceptible to premature oxidation than the anthraquinone types.

APPLICATION

DYEING———Dyeing of hosiery with Algosols is carried out in either the rotary or paddle machine at 120°F on previously well-wet-out hose. Twenty to thirty percent of salt is added in two parts, the first part after 10 minutes of dyeing and the second part after 20 minutes. Dyeing is continued for a total of 30 to 35 minutes in a cooling bath.

DEVELOPMENT———Following dyeing and without any intermediate rinsing, development of the Algosol dyestuff on the fiber is carried out with sodium nitrite in the presence of sulfuric acid. There is a choice of two developing methods: one is that of adding the nitrite and sulfuric acid to the dyebath after exhaustion of color; the other method is that of dropping the dyebath and oxidizing in a fresh bath. The method of dyeing and oxidizing in the same bath presents the danger of poor crock fastness, due to oxidation of any unexhausted color, which might adhere to the fibers. The two-bath method is preferable as it practically eliminates this danger of poor crock fastness. The nitrite is added to the machine first and is allowed to circulate through the hose for three to five minutes before the sulfuric acid is added. For full development of light shades, usually run on hosiery, one pound of sodium nitrite and three quarts of sulfuric acid per 100 gallons are sufficient. The length of time necessary for development depends on the temperature of the bath. Most Algosols, but not all, develop or oxidize in 15 minutes at 90°F. This cold-developing method is especially suitable for Blue IBC, which is sensitive to overoxidation. A developing method for the other Algosols that is found to be entirely satisfactory is that of adding both the nitrite and sulfuric acid to a cold machine bath and then of heating this bath immediately to 120°F and of allowing development to continue for 5 minutes. For a few slow-oxidizing Algosols, such as Blue 04B and Yellow GCA, the temperature of the bath is raised to 140 instead of 120°F.

AFTERTREATMENT———The dyed hose, after development, are given a good cold wash and are neutralized with soda ash to be freed of any acid. Soaping is then carried out in a fresh bath at 180 to 200°F, and this is followed by a hot wash and usually by a softening treatment. Soaping of the Algosols after development is important as correct shade and maximum fastness are obtained only after a thorough hot soaping.

PRACTICAL FORMULA———A typical practical formula is as follows:

ALGOSOL MAIZE

65 lbs mercerized anklets in a Smith-Drum rotary machine with a volume of 125 gallons. After the hose have been bleached and washed, make a fresh bath and add

1.5 lbs Nekal NF

Heat bath to 120°F. Add slowly
756 grains Algosol Yellow GCA CF
189 grains Algosol Yellow IGK CF
previously dissolved in hot water. Run 10 minutes in a cooling bath. Add 15% Glauber's salt. Run 10 minutes in a cooling bath. Add 15% Glauber's salt. Run 15 minutes in a cooling bath. Drain machine but do not wash. Refill machine with cold water and add immediately
1 lb sodium nitrite, previously dissolved.
Run cold 5 minutes. Add 3 quarts of sulfuric acid and heat immediately to 140°F. Run 5 minutes at 140°F. Drain machine and follow with a running cold wash. Refill and add 1.5 lbs soda ash. Heat to 120°F and run 5 minutes. Drain machine and follow with a running wash. Soap 10 minutes at 190°F with
1.5 lbs Igepon T Gel
4 ozs soda ash.
Wash in a fresh bath at 160°F. Soften 10 minutes at 110°F.

ACTION OF NITROUS ACID——— The only disadvantage in the use of Algosols on cellulosic fibers is the corrosive action of nitrous acid on metals, the acid being formed from sulfuric acid and sodium nitrite in the developing bath. All metals are attacked by nitrous acid but to different degrees. Stainless steel is found to resist the destructive action of this acid better than other metals. The 18-8-SMO type of stainless steel is the most suitable wherever nitrous acid baths are necessary.

USE ON YARN———The water-soluble leucoesters of vat colors are also applicable in light shades to cellulosic yarns on package-dyeing equipment, but the details of yarn application will not be taken up at this time.

CONCLUSION

Thus we see that the easy way to vat-color fastness on hose is to employ Algosols because of ease and simplicity of application on conventional hosiery equipment, because of good leveling and penetrating qualities, and because of excellent duplication of shade on successive dyeings. These advantages of application are accompanied at the same time by lower total cost than with the water-insoluble vat dyes.

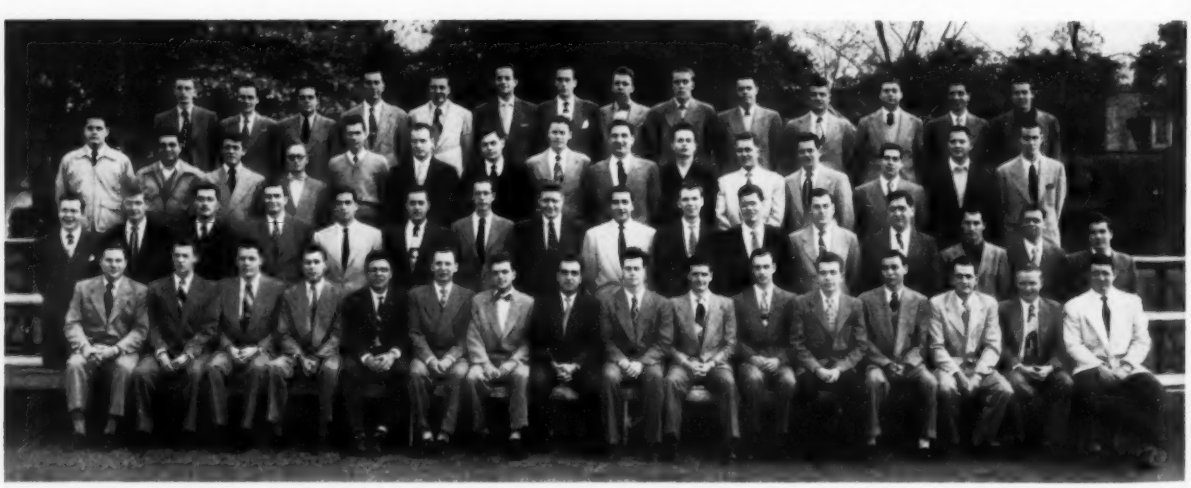
Committeemen Named for NNE Outing

OFFICIALS and Committeemen for the Northern New England Section's Annual Outing, to be held June 8 at the Merrimac Valley Country Club (Methuen, Mass), have been announced as follows:

General Chairman—Harold C Wood
Chairman Ex-Officio—C Wendall Lever
Golf—Alfred T Grant, *Chairman;* Paul E McCarthy, Herbert E Wieland, Henry T Rooney
Softball—Joseph E Travers
Horseshoes—Hans G Walz
Card Games—Philip S Durfee
Prizes—John R Berwick, *Co-chairman;* George F Long, *Co-chairman*
Publicity—Hyman P Selya, *Chairman;* Frank O'Neil, Harold Chapin, Richard G Robertson
Dinner—Edward B Bell, *Chairman;* John R Markgren
Program—John F Sheehy, Azel W Mack

MEMBERSHIP on MAY 1, 1951

Section	Sr.	Jr.	Assoc.	Stu.	Total 1951	1950	1949	1948	1947	1946	1945	1944	1943	1942	1941
Northern New England	447	39	84	1	571	567	545	550	556	528	469	402	407	398	391
Western New England	123	7	24	—	154	144	142	97	—	—	—	—	—	—	—
Rhode Island	532	57	73	12	674	589	556	511	501	471	405	348	352	341	337
New York	1092	82	186	1	1361	1335	1282	1285	1262	1167	1008	817	707	651	606
Hudson Mohawk	150	16	15	—	181	163	117	—	—	—	—	—	—	—	—
Philadelphia	837	58	114	—	1009	971	930	871	833	740	644	550	513	517	475
Piedmont	553	79	81	15	728	669	587	511	492	434	366	326	286	309	297
South Central	116	13	15	—	144	140	128	111	102	100	87	83	72	80	71
Southeastern	182	24	22	1	229	237	224	209	198	166	141	141	146	175	142
Mid-West	298	12	43	—	353	341	336	337	326	287	261	209	198	194	193
Pacific Northwest	28	1	3	—	32	35	—	—	—	—	—	—	—	—	—
Pacific Southwest	80	3	9	—	92	83	115	81	—	—	—	—	—	—	—
Student Chapters	—	—	—	339	339	421	312	240	142	50	14	20	56	117	80
Unclassified	282	17	101	12	412	369	340	286	286	237	199	151	122	82	87
	4720	408	770	381	6279	6064	5614	5089	4698	4180	3594	3047	2859	2864	2679
Corporate					282	295	300	300	299	302	299	184	82	77	33
Totals					6561	6359	5914	5389	4997	4482	3893	3231	2941	2941	2712



Philadelphia Textile Institute Student Chapter

Patent Digest

(Concluded from Page 340)

sion the fabrics have to be thoroughly rinsed in clear water, to neutralize any acid present, by a dilute soda ash solution. A characteristic feature of this process is that practically no exhaustion takes place, the dyestuff solution being quantitatively transferred to the fibrous material. The dye liquid contained in a shallow vat has to be replenished with the original dyebath concentration in contrast to standard padding methods where the dyestuff amounts absorbed by the material have to be added to bring the bath to the original strength. Organic acids in amounts of 2½ to 40 per cent of the dyebath impart good leveling properties; they may replace to a certain amount the lactones. A dyebath containing 15 per cent by weight lactone and 25 per cent acetic acid was superior in this respect to a dyebath containing 30 per cent lactone and no acid.

Example: a white cellulose acetate ribbon was passed at a speed of 30 yards per minute through a solution of ½-15 per cent dyestuff (Neolan, basic, acid, spirit soluble), 5-32 per cent γ-valerolactone, balance water at 26-30°C. The goods were neutralized with 5 per cent soda ash solution and rinsed.

Although no theoretical explanation of the process is offered, it must be assumed that the lactone acts as a dyestuff solvent, at the same time modifying to a certain extent the fiber's structure by a swelling reaction. Prolongated contact of fibers and dyebath, therefore, has to be avoided to restrict the swelling effect.

References cited by the Patent Office, among others:

U S Pat 2,428,834 (1947—Celanese): dyeing acetate of cellulose with dyes dissolved in solvents and swelling agents (cf *Am Dyestuff Reptr* 37, 397 (1948).

U S Pat 2,347,508 (Carbide and Carbon): dyeing vinyl resin fibers by passing the fibers through a dyebath containing a certain amount of a solvent (mesityl oxide, butyl acetate, cyclohexanone) to soften up the fiber's surface without affecting the tensile strength.

U S Pat 2,249,607 (1941 — Atlantic Rayon — Galatioto): dyeing cellulose acetate with an acid dye (Alizarine Cyanine Green, Wool Fast Blue) and an organic solvent plus an acid; the solvent is mostly formic or lactic acid.

Esters of valerolactone have recently been recommended as effective plasticizing agents (U S Pat 2,428,015—Bush, et al—1947).

DYEING VINYL—or VINYLIDENE POLYMERS—Glycol Esters as Solvents. C, 4, 07

U S Pat 2,537,177
(American Viscose Corp—Woodruff—Jan 9, 1951)

The difficulties in dyeing vinyl (Vinyon) or vinylidene (Velon) yarns are well known. Some attempts to solve this problem have been made (e g, by dyeing these strongly hydrophobic fibers with water insoluble acetate dyes) but the dyeings proved to be insufficiently fast to light and crocking. Moreover, as pointed out in the present specification, the dyes migrate in vinyl or vinylidene fibers to a greater extent than in cellulose ester material. Dyeing with basic dyes is also said to be unsatisfactory; the dyeings have poor resistance to light, crocking and migration (cf U S Pat 2,489,537, Neumann, *Am Dyestuff Reptr* 39, 201 (1950). Water-soluble dyes (i e, direct or acid dyes), otherwise very desirable, could not be used up to now because the aqueous dye solutions do not penetrate the fibers.

The inventor found in this latest patent that it is possible to apply water soluble dyes by dissolving them in water-miscible organic liquids, which are absorbed by the resin polymers in an amount from 20-50 per cent. The dyestuffs have to be soluble in these liquids in concentrations of at least .01 per cent. Examples of the solvents to be used include the monoethyl, monomethyl and benzyl ethers of ethylene glycol or diethylene glycol, as well as diethylene glycol mono acetate; that is, compounds of the "Cellosolve" type. Some direct dyes (e g, Benzo Fast Orange W S A, C I 326, Benzo Fast Black LA or Diphenyl Fast Blue G L N) or acid dyes (e g, Polar Red R S, C I 430; Calcocid Blue Black ex, C I 426, etc) are enumerated, but the invention is not restricted to dyes of a specific constitution. When dyeing is performed with these solutions the resin is quickly brought to a highly swollen state and the dyeing process is carried out in a very short time, (e g, within five minutes or less). The temperature should not exceed 65°C, although the permissible temperature depends on the nature (the softening point) of the resin. The dyeing procedure is based on a rapid swelling action. Care must be taken to interrupt the immersion in time to prevent undue shrinkage by quickly rinsing the dyed goods in cold water. It is surprising to note that the dyes are obviously firmly anchored to the fiber and that superficially adherent dyestuff particles can be removed without redissolving the dyes incorporated within the resinous fibers. Thus, unexpected fastness properties of dyeings can be observed. Shrinkage of the filaments during the dyeing process is best prevented by maintaining the material under slight tension.

References cited by the Patent Office, among others:

U S Pat 2,274,751 (1942—Celanese): coloring cellulose acetate with acetate dyes in mixtures of solvents, one of them a swelling agent of low boiling point (below 90°C, e g, alcohol, ethylacetate, etc), the other one a high boiling liquid (e g, halogen—benzene or amylacetate).

U S Pat 2,260,543 (1941—Carbide & Carbon): dyeing thermoplastic material with organic dye solutions, exerting a limited solvent action, penetrating but not dissolving the fibrous material (i e, a mixture of a solvent and a non-solvent).

U S Pat 2,259,515 (1941—Celanese): dyeing cellulose acetate with dyes which otherwise have no affinity and a small amount (5-10 per cent) of a swelling agent; mixtures of glycerol butal, glycerol monochlorohydrin and acetic acid are mentioned.

STATIC ELECTRICITY PREVENTION——Glycols plus Common Salt Used G, 1

Brit P 649,877
(British Nylon Spinners—Andrew—Feb 7, 1951)

A suitable composition for preventing accumulation of static electricity on textile goods, particularly on nylon yarns, must adhere as a continuous layer on the surface of the yarn to be a good electrical conductor. It must also be easily removable and therefore should not be of an oily, water insoluble constitution.

These requirements are said to be fulfilled by the application of a low volatile aliphatic polyhydroxy compound, which boils above 200° C (eg, a glycol), in which sodium chloride is dissolved at a concentration below the saturation point to avoid crystallization. The salt confers the necessary conductivity to the composition. An example suggests the application of a 2% (by volume) solution of common salt in diethylene glycol containing 20% by volume water.

Methods for preventing the formation of static electricity cited in earlier issues of the *Dyestuff Reporter* may be briefly mentioned:

Brit P 576,305 (Du Pont): a starch dispersion containing an electrolyte (eg, potassium acetate) is used (cf *Am Dyestuff Reptr* 35, 503, 1946).

U S Pat 2,443,782 (Pacific Mills, 1948): preparing with a quaternary ammonium compound and aftertreating with an electronegative substance (graphite) as a conducting layer (cf *Am Dyestuff Reptr* 38, 107, 1949).

U S Pat 2,498,408 (General Aniline—1950): applying acid high substituted alkyl phosphates, especially for cellulose acetate (cf *Am Dyestuff Reptr* 39, 301, 1950).

ABSTRACTS

Logwood and Its Application

O Newsome, *Dyer* 104, 625-7 (1950); 105, 94-7, 162-4, 227-9, 285-7, 359-61 (1951).

Logwood was brought to Europe by the Spanish after the discovery of America, and its use appears to have spread rapidly in spite of official opposition. It is first known to have been used in England during the sixteenth century, but owing to the fact that it was said to give fugitive colors, its use as a dye was prohibited by Act of Parliament. The prohibition of the use of logwood caused great distress among the dyers of that country, and attempts to evade the law were numerous and frequently successful. The Act was repealed in 1661.

It should be remembered that logwood at that time was used not only for blacks but also in conjunction with tin and aluminum mordants for purples and blues, and as the blue component of greens and browns. Its use today is practically confined to blacks; wool is usually dyed on a chromium mordant, while silk is dyed on an iron mordant.

The operation of dyeing wool with logwood is described in detail. The coloring matter extracted from the wood is haematoxylin, which oxidizes to haematein. If the chrome mordant contains an appreciable amount of chromic acid, a partially oxidized haematoxylin is employed, while if the mordant is chromic oxide, a completely oxidized extract (haematein) is used. Logwood blacks on a chrome mordant are moderately fast to light and have excellent fastness to milling.

Logwood blacks are still the standard blacks on natural silk, and seem likely to remain so, as they are unequalled in richness and beauty of shade, and possess satisfactory fastness properties. Furthermore, they may be combined with tin-phosphate and tannin-iron weighting processes, and logwood is itself a useful weighting agent.

The operations in the dyeing of blacks on unweighted silk may be classified as follows: mordanting with nitrate of iron; precipitation of ferric hydroxide by washing and alkali treatment; dyeing with Prussian blue; treatment with tannins; dyeing with logwood; fixing with ferrous sulfate or sodium bichromate; soaping. If weighting is desired, some of these operations are repeated several times.

Logwood blacks are dyed on nylon and cellulose acetate by methods which differ only in detail, and which may therefore be conveniently considered together. The process consists essentially of treatment in a hot solution of unoxidized hematine crystals, followed by treatment in a hot bichromate solution to oxidize the haematoxylin to haematein and form the haematein-chromium lake. Logwood blacks are easily dyed on nylon by this method, and are of pleasing shade, good fastness to light, and very good fastness to repeated severe washing. It has been found that nylon is tendered to a much smaller extent on exposure to light when dyed with logwood than when dyed with diazotized and developed blacks.

The difficulty in applying logwood to cotton and linen arises from the fact that these fibers do not dissociate metallic salts in solution and have no affinity for chromic acid. They cannot, therefore, be mordanted by the simple methods used for wool or silk, but must first be impregnated with a substance which can combine with the metallic mordant, tannins, such as sumac or myrabolams, being used for this purpose. A typical procedure for dyeing logwood on the jig by this method is described. Cotton may also be dyed by padding in strong logwood extract and acetic acid, squeezing and drying, and then treating with sodium bichromate and soda ash, followed by steaming.

In printing, logwood is used mainly in the form of a solubilized lake, under the name of "Steam Black." This is prepared by precipitating the chromium or iron lake of logwood from acetic acid solution and re-dissolving in sodium bisulfite. Usually both chromium and iron are present, as a mixture of the two mordants gives better results than either metal alone.

Logwood is extensively used for the production of blacks on leather, particularly on full chrome and semichrome leathers. An excess of logwood on a chrome leather tightens the grain, and may cause the leather to become hard and brittle, but a moderate amount fills the grain and gives the leather a full handle which is unobtainable in any other way. For these reasons, blacks are not dyed with logwood alone, but usually with a combination of logwood and Nigrosine (water soluble) or other suitable acid, basic or direct dye.

Other uses for logwood include the dyeing of furs, buttons, straw, paper, wood and feathers.—WHC

Glass Fiber

A M Robertson, *British Rayon & Silk J* 27, 63-4, December, 1950.

The process of manufacturing glass fibers may be outlined as follows. First a special glass is made by mixing the desired components, which in addition to the basic sand may include soda, dolomite, borax, fluorspar or other chemicals. After mixing, a melt is formed by heating, and the fluid glass is cut by a gob cutter into pieces which fall into spirally grooved rollers which make them into marbles. These marbles are the raw material for glass spinning, which may take the form of a continuous filament or staple fiber production.

In the production of continuous filament yarns the glass marbles are fed into a platinum crucible where they are melted at a temperature of about 2200°F. The bottom of the furnace is also the spinning jet, in that it contains the holes which form the filaments by extrusion of the molten glass through them. Two "jet" sizes are used, these being 102 and 204 holes, producing yarns of 90,000 yds/lb and 45,000 yds/lb respectively. The yarns are collected without twisting by winding sideways on to a cylindrical shell or tube, at speeds of from 6000 to 10,000 feet per minute. Between spinning and winding a textile size is applied to offset the high abrasion susceptibility of the glass fibers formed in the spinning. The package of twistless thread is then taken to a ring twister of conventional type.

Glass is in some ways ideal for synthetic resin laminates, owing to its dimensional stability and its high tensile strength. Firemen's and miners' helmets are now being made from glass yarn laminates; also, in the USA, body armor said to be "virtually bullet-proof" is made from these laminates.

The handle and drape of glass fabrics can be much improved by "Coronizing," a process developed by the Owens Corning Company. This is a heat treatment of the fabric at about 600°C, which softens the glass and enables the yarns to release weaving and other strains by crimping. The crimped cloth is then treated with a silicone-type resin and re-heated to set the resin. It then possesses better handle, which is described as soft and mellow and equal to many rayon cloths. The finish will wash (washing of glass fabrics being simply dipping in detergent, rinsing in water, and drying). No ironing is needed. —WHC

Some Problems in Garment Dyeing

L P Rendell, *Textile J Australia* 25, 1047-50, December, 1950.

The redyeing of worn garments bristles with difficulties. These difficulties can be divided into two main sections—those inherent in the dyeing to a solid shade of materials containing a diversity of fibers, each possessing its own characteristics, and those which are brought about by various factors associated with wear.

Over many years the garment dyers' troubles have been increased by the textile manufacturers in their endeavors to develop more and more complex materials and by the increasing use of new man-made fibers. With the ever-increasing cost of wool, the tendency to use other fibers along with wool in the same cloth will no doubt be further expanded, and the garment dyer can look forward to further problems in this direction.

On the basis that only wool and a cellulosic fiber are present, the soundest method is to choose, as far as possible, homogeneous direct dyes which will dye both fibers to approximately the same shade. If any nylon or acetate rayon is present in any of the articles dyed it is best to deal with them in a fresh bath containing a suitable dispersed acetate dye.

Another problem related to the original manufacture of the goods is to get rid of the resin finish used to bring about crease-resistance on spun rayon fabrics. These resins are almost always of the urea-formaldehyde type. Removal is essential if satisfactory dyeing is to be accomplished, and the best way is to treat the goods for one hour in a boiling bath containing one pint of formic acid (85 per cent) per 10 gallons of water, followed by neutralization in a fresh bath with soda ash.

Some form of cleansing is usually necessary before dyeing, and wherever possible dry cleaning is the most satisfactory preparation.

A major problem is the question of the covering of the faded portions of the woolen garments, which fading may be due to prolonged exposure to sunlight or to the fact that the original dye was of poor fastness to light. It is only in the first case that any real trouble is met in redyeing, as in such cases the wool on the exposed portions is chemically damaged and has increased affinity for most dyestuffs. By giving the goods a warm pretreatment with ammonia and by the correct choice of dye, satisfactory results can be obtained in one bath in all but the worst cases.

Stripping before redyeing should only be resorted to if unavoidable. The pretreatment with ammonia will have some stripping effect on acid dyes. If a more drastic treatment is necessary, hydrosulfite and ammonia at 40-50°C may be used, in preference to Rongalite which requires a boiling bath.

The redyeing of garments consisting of one single vegetable fiber does not as a rule present any considerable problem. When several different fibers of vegetable origin, each possessing its own affinity characteristics, are present in the same article, it becomes more difficult or even impossible to obtain absolutely solid results. Nevertheless, much can be done in the way of proper choice of dyes.—WHC

The Processing of Nylon. Suggestions for Dyeing Nylon Woven Fabrics, and for the Dyeing of Wool-Nylon Materials to Solid Shades

Anon, *Textile Mercury & Argus* 124, 285-7, 334-5, Feb 16 and 23, 1951.

Nylon may be dyed with practically all classes of dyestuffs, but the fastness properties of the resulting dyeing on nylon materials cannot be predicted from the fastness properties of the same colors on older-established fibers. For uniform dyeing and ease of application, dispersed dyestuffs offer the most satisfactory results on nylon materials. In many instances, however, higher standards of light and washing fastness will be required than are obtainable with these dyes.

By selection from the acid and direct dyes it is possible to obtain a range of shades of adequate light and washing fastness. Heavy shades are difficult to attain, due to the low saturation point of many of the acid dyes on nylon. Selected chrome dyes may be used if greater wash fastness is desired.

The author offers some practical suggestions for handling nylon fabrics on the jig and also in the beck.

Nylon yarns possess certain unique properties, which recommend them for use in conjunction with other fibers. One of the most notable uses of this kind at present is in conjunction with wool yarns, e g, fine denier nylon yarns used as reinforcing threads for the production of super lightweight fabrics. Greatly enhanced strength may be conferred upon the wool yarn by using nylon yarns in such a manner, and at the same time, by virtue of the fineness of the reinforcing structure, the inherent properties which have made wool so widely used as a textile fiber can be retained. Also, the enhanced abrasion resistance brought about by the use of nylon as a reinforcing yarn recommends its use, for instance, as a splicing yarn in men's half hose. The selection of suitable acid dyes for wool-nylon blends is not easy, however, because the nylon fiber has a greatly reduced number of basic sites available for dye combination, compared with wool. This kind of work involves extensive laboratory investigation.—WHC

The Production and Uses of Water-soluble, Alkali-soluble Cyanoethyl Cellulose Ethers as Soluble Yarns

J H MacGregor and C Pugh, *J Soc Dyers & Colourists* 67, 74-80, February, 1951.

Soluble yarns have two main uses—in the production of fabrics containing yarn of little or no twist and as a substitute for the draw-thread in hosiery manufacture. In the former they are doubled with a twisted staple yarn, the doubling twist being in the opposite direction and equal to that of the staple yarn (e g, a singles staple yarn of "S" twist, 20 turns, is doubled with a soluble yarn of "Z" twist, 20 turns). Unlike twistless staple yarns, these doubled yarns knit and weave well. When the fabric is constructed, the soluble yarn is removed by dissolution in a suitable solvent, leaving the staple yarns with zero twist. Soluble yarns which have been used in this way include cellulose acetate and calcium alginate.

The main requirements of a soluble yarn are—(1) solubility in a cheap solvent which will leave the majority of other textile fibers unaffected; (2) good appearance and strength; (3) simple and inexpensive production.

By reaction of acrylonitrile with viscose, a cyanoethyl cellulose yarn has been produced which would seem to meet these requirements. The yarn can be manufactured with a dry tenacity of 1.5 g per denier, which is satisfactory for a "carrier" thread, and requires only the ordinary machinery such as is used for producing viscose rayon. It is insoluble in water but dissolves quickly in a cold 1-2 per cent aqueous solution of sodium hydroxide; and where a caustic solution is not permissible, e g, in twists with wool, a cold 25 per cent aqueous solution of ammoniumthiocyanate may be substituted.

Full details are given of the reaction between acrylonitrile and viscose, and of the production of the yarn on a semi-large scale.—WHC

The Delustring of Acetate Rayon

R J B Marsden and A R Urquhart, *J Textile Institute* 42, T15-78, February, 1951.

The work described in this paper was done at the Shirley Institute for the British Cotton Industry Research Association. The paper was communicated to members of the Association as a private and confidential memoir in December, 1943, and

has now been released for publication.

The authors in their introduction point out that cellulose acetate, unlike other rayons, loses much of its luster when it is boiled in water or soap solution, and that this property has been used in the past as a convenient method of producing mat and semimat finishes. They review the work done by other investigators in this field in improving the delustring effect by adding to the soap solution such substances as phenol and cyclohexanol.

Their own investigation covers a broad range of experimentation, including the effect of soap concentration and temperature and the choice of a suitable soap; a comparison of various delustrants; the effect of the delustring treatment on the strength of the material; and a comparison of the delustring action on different types of acetate.

The authors recommend, for a semimat effect, a treatment in 0.2% soap solution at 97°C for ½ to 2 hours, according to the degree of dulling required. For a full mat finish they recommend a treatment in a bath containing 0.5% soap and 0.2% phenol, at 97°C for 1 to 2 hours. Undue prolongation of the process, they say, will result in unnecessary loss of strength. It is essential to use a neutral soap.

The delustring of acetate is stated to be due to a pitting of the fiber surface, causing a scattering of the light falling on it.

The authors have also investigated relustring of acetate, and recommend steeping for 1 hour in a cold aqueous 2% solution of phenol, removing excess liquor by suction, and drying at a low temperature, followed by washing in water with the addition of ammonia.—WHC

Aspects of Emulsion Applications in Textile Processing

"Technical Correspondent," *Textile Mfr* 77, 140-2, March, 1951.

The influence of fats, oils and waxes on textile processing generally is very far-reaching when it is considered that without such bodies the working up of fibers into yarns and yarns into fabrics would be a practical impossibility in many instances.

Briefly, an emulsion may be described as an intimate mixture of two normally immiscible liquids in the form of a very fine dispersion of one of the liquids in the other. A good example of a commonly used emulsion is that of olive oil and soap emulsions used in silk soaking.

Emulsifying degumming liquors have an important part to play in the removal of silk gum and oils used in the preparation of yarns for silk hosiery. The author states that in degumming, the pH value should not exceed 10.5 and should preferably be kept at 9.2 as far as possible throughout the process. Hard water should be completely avoided and trisodium phosphate used instead of soda ash along with soap and sulfonated oils, to bring about good emulsification of the sericin.

Considerable research has been devoted to the elucidation of the action of soap in removing foreign matter from fabrics and other surfaces. It would appear that there are still differences of opinion as to whether soap is a colloid or a crystalloid. For the former point of view it is known that soap solutions are gels when cold and diffuse slightly through membranes in the manner of colloids, and are electrically conductive. These are the properties of electrolytes or crystalloid bodies soluble in water. On the other hand, it has been shown that lamp black particles free from oil may be suspended for months in fairly concentrated soap solutions, so that here is an example of colloidal powers. These facts, which make it clear that soap solutions exhibit both colloidal and crystalloid properties, have led McBain and other workers in this field to the conclusion that soaps should be classed as electrolytic colloids. It is certain that without colloidal properties soap solutions would not have the dirt and "soil" attracting and dispersing properties that make it so valuable as a washing and cleansing agent for all sorts of textiles and other materials.

Naphthenic acid soaps are produced by the sulfonation of selected and refined fractions of crude petroleum sludge such as the cycloparaffins and high molecular weight paraffins. Claims are made that such soaps are less alkaline than ordinary soaps and have excellent emulsifying properties. They are also good penetrants and detergents, are germicidal, antioxidant, and have good resistance to electrolytes.

The valuable properties of triethanolamine as solvent and emulsifier are well-known, and it should be noted that this substance used in molecular proportions along with a fatty acid (stearic, palmitic, oleic, etc) will give useful soaps. These soaps with their low alkalinity and solvent properties may either be used alone for cleansing delicate fabrics or, if required, for oil-stained goods; they may also be mixed with petroleum and organic solvents. The most useful of such soaps is that produced by the action of triethanolamine on oleic acid. Mineral oils and all types of fats, waxes, etc, are said to be easily emulsified with soaps of this type.

The wetting, emulsifying and dispersing powers of soap solutions have been unrivalled until the past two decades. For many purposes, however, soap has almost been displaced by the newer synthetic detergents. Today it is possible to produce detergents which retain scouring and detergent powers in alkaline, acid, or neutral solutions. Such materials can, so to speak, be "made to order" so that the best possible types of detergents for any specific job can be manufactured if necessary.—WHC

A "Problem" Navy Blue

A Carpenter, *Textile Recorder* 68, 109-11, March, 1951.

In this article a practical dyer discusses the many difficulties which have arisen in the application of the Sulphon Cyanines in wool dyeing. These dyes, which are sold under various trade names, have been in use for over 50 years because of their good fastness to light, washing, perspiration, and salt water. They are, however, subject to difficulties not found with other dyes.

The three main difficulties encountered appear to be (a) general unevenness; (b) inconsistency of shade, manifested by a progressive dulling during dyeing; and (c) on knitted goods, light or even completely undyed patches. The last-named trouble is the most simple of solution, examination under the ultraviolet lamp showing aggregations of mineral oil due to careless lubrication during knitting. Mineral oil usually acts as a dyeing resist with wool colors, but Sulphon Cyanine is peculiarly sensitive. It is obvious, therefore, that all goods to be dyed with this color must be thoroughly scoured.

Uneven dyeing is often the result of uneven retention of alkali from scouring or of the use of acids or acid-forming salts in the dyebath. Sulphon Cyanine is extremely sensitive to changes in pH value. In spite of the ammonium acetate technique advised in so many of the manuals, it should always be dyed throughout at the neutral point, at which it actually shows a far more level "initial strike" than many milling dyes. Exhaustion of the bath proceeds at a steady rate and acid additions are completely unnecessary.

The most general and longstanding fault encountered with Sulphon Cyanine on wool, however, is a deterioration of the shade as dyeing proceeds, the end-product being an olive-brown. The usual observation is that the goods, after being normal for the earlier part of the dyeing, suddenly commence to turn a greener and duller shade of blue. Prolonged dyeing may cause a change to black or even dark brown, sometimes in patches. The original shade cannot be restored and research has shown that this is due to decomposition, not uncommon in azo dyes on long boiling, catalyzed by any slight

bisulfite attack on the dyestuff, the source being the slight breakdown of the sulfur linkages of the wool molecule which always occurs when that fiber is boiled for any length of time, particularly in neutral baths. It has, therefore, long been an accepted practice to dye this color a little below the boil, usually at 180°F, when the effect is minimized. Even so, this trouble can still be experienced.

Some dyers seek to inhibit the reduction by the addition of an oxidant, such as bichromate, to the bath. This is stated to give protection. The writer wishes to remain neutral on this point.

Some years ago the author observed that 1 per cent Peregal O appeared to stabilize this dye and prevent decomposition. A similar product now available is Dispersol VL.

To sum up, Sulphon Cyanine is capable of giving consistently good results if applied with the confidence born of an intelligent appreciation of the basic cause of difficulties.—WHC

The Finisher and Textile Quality

J G Evans, *Textile Mercury & Argus* 124, 408, 411, 455, 457, March 9 and 16, 1951. (From Textile Institute Symposium)

Quality in textiles is not the responsibility of any one section of the textile industry. It is an attribute which should be the joint concern of designer, spinner, weaver, finisher and, indeed, merchant or manufacturer. All who process the textile raw material, yarn or fabric contribute to the overall quality factors, and bad workmanship by any one may either nullify the efforts of the others, or at best, greatly increase their difficulties and reduce output.

Coming as he does at the end of the processing chain, the finisher has a special responsibility. He can, of course, make or mar the work put into the textile by those before him. All in all his task is to enhance the appearance by skilful coloring or to enrich the textile merits by subtle finish.

There are three main categories of the finisher's work to consider, viz, (a) preparing, (b) dyeing or printing, and (c) finishing proper. In the prepare the finisher aims at making the yarn or fabric most receptive to the even and level application of the dye and has regard to the appearance and handle of the cloth. In this process he may have to remove natural or added impurities. All too often, nowadays, some of the added impurities are unnecessary or present by accident, as, for example, oil-stains and solid dirt in loom-state goods. Finely divided solid metal from moving parts, such as spindle flanges, entrapped in the yarn may result in an area of overbleaching with the formation of tender regions or even holes in the ultimate bleached fabric.

The advent of the synthetic fibers, as for example nylon, calls for added watchfulness if only because they are new and do not necessarily respond to or demand the same treatment as existing fibers. Thus, before dyeing, nylon fabrics need both scouring and setting.

It is the dyer's and finisher's job "to convert the proverbial sow's ear into a silk purse." It is in the art and science of finishing proper that the finisher exerts maximum control over quality, for it is in this sphere of his activity that he can exercise the most profound influence over the merits of a textile.

The second instalment discussed some of the important finishes in use today, starting with mercerization, "a finish without a peer both for its beauty and its permanency," and following with the application of synthetic resins for anticrease, permanent glaze, and embossed effects; water-, flame-, and mildew-proofing; Sanforizing and nonshrink treatments.—WHC

Use of Ultrasonic Vibrations in Textile Treatment

A J Hall, *Textile Mercury & Argus* 124, 493-4, 499, March 23, 1951.

The author describes two recent textile processes in which ultrasonic vibrations have been found to produce useful results.

The first process (B P 618,794) is concerned with modifying wool so that it has a reduced tendency to felt and thus to shrink when washed. The process consists of generating ultrasonic vibrations within a liquid such as water in which the wool material is immersed. Thus, in one example, all-wool knitted fabric immersed in water is there exposed for one-half hour to ultrasonic vibrations (250 kilocycles per second) produced by a piezo-electric oscillator having an input of 600 watts of electrical energy. Under these conditions the wool is so changed that when withdrawn and milled together with untreated similar fabric, it shrinks only 5 per cent in area as compared with 28 per cent for the untreated fabric.

It is possible that the vibrations soften the wool scales so that their overlapping edges are less able to cause felting, but this is a subject which requires further investigation.

The second interesting use of ultrasonic vibrations (B P 648,830) is in the rayon field, particularly in the production of viscose rayon. If the viscose solution, after extrusion through the spinnerets, is exposed to these vibrations while it is passing through the coagulating bath and over the Godet wheels, the penetration of the coagulating liquor into the interior of the filaments is said to be accelerated, and the long-chain molecules of regenerated cellulose are aligned more nearly parallel to the length axis of the filaments, thus leading to the production of stronger yarn.—WHC

Physical Textile Testing: a Training and Reference Manual

M J Wesson, *Textile Inds* 115, 108-67, March, 1951.

Textile testing, as a whole, has only in recent years begun to come into its own. The development of adequate testing equipment, the competition offered by the synthetic fibers, the increased demands of quality as well as quantity, along with the insistence by the customer that fabrics be made to rigid specifications have all contributed to the increased interest in machines and methods of testing.

The author states that this manual is intended primarily as a training device for new personnel of the Testing Department of the Research Division of the West Point Manufacturing Co. However, it is expected that the manual will be used as a reference by all individuals in the Research Division engaged in physical testing. Thus, the techniques and procedures will become even more standardized and the personal equation reduced to a minimum. Also, the manual should serve as a reference for production and sales executives who request the testing services and utilize the results sent to them.

A further purpose of this manual is to present the various physical tests made on fibers, yarns and fabrics in as simple a manner as possible, in order that an individual unfamiliar with textile testing may understand something of the nature of these tests. Though many books and articles have been written on textile testing, there are very few that explain the "step by step" techniques of performing the tests. It is hoped that this purpose has been accomplished.

The manual is not intended to replace publications of the American Society for Testing Materials, but to supplement these publications for ease of training and for quick reference; it is hoped that the manual also will be used in clarifying certain testing procedures and aid in their practical application.

The following subjects are covered: General Laboratory Practice; Fabric Analysis; Yarn Analysis; Fiber Analysis; Processing Tests; Elementary Statistical Calculations; and Machine Calibration. It is highly illustrated.—WHC

NEWS

• Blackman-Uhler Opens New Southern Dye Lab

More than 100 Southern textile executives and scientists were on hand May 5 for the official opening ceremonies for the new, advanced Blackman-Uhler dye laboratory in Spartanburg, S C. The affair was conducted by the Blackman-Uhler Company, Southern representatives for the Hilton-Davis Chemical Company Division of Sterling Drug Inc, Cincinnati.

Attending the ceremonies were James F Thompson, Sterling vice-president in charge of Hilton-Davis; Nelson S Knaggs, H-D vice-president in charge of sales; George Nickles and Arthur Davis, textile technical division.

The feature of the day's program, after a dinner given at the Spartanburg Country Club, was the showing by Mr Knaggs of his new all color motion picture, "On the Trail of the Ancient Maya," a documentary film record of his recent expedition into Yucatan and Central America. An explorer, Mr Knaggs carried the flags of the Explorer's Club, New York, and the Cincinnati Museum of Natural History, of which he is a director.

The laboratories are situated at 182 Ezell Street in Spartanburg. Blackman-Uhler have been associated with Hilton-Davis, producers of dyestuffs, intermediates and pigments, for two and a half years, during which they have expanded considerably in serving seven states, according to Mr Thompson.

P C Blackman and William H Uhler, he explained, have both had long experience in the technical and practical side of the textile field.

The laboratory itself, described as extremely large for a service laboratory of its type, is said to have been supplied with the latest, complete, scientific equipment for the testing of dyes and for experimental work. It is staffed with graduate research and development chemists.

Installations at Blackman-Uhler include a Fade-Ometer for checking the lightfastness of colors, an acid-ager, a print machine, padder, and a package dyeing machine.

Blackman-Uhler receives from Hilton-Davis finished dyestuffs, after which it matches colors and shades for various textile mills in the South, in addition to rendering technical service.

COMING EVENTS

AMERICAN ASSOCIATION OF TEXTILE TECHNOLOGISTS

Meetings: June 6, September 12, October 3, November 7, December 5 (Builders Club, New York).

AMERICAN CHEMICAL SOCIETY

Meetings: September 3-7 (New York, N Y).

AMERICAN LEATHER CHEMISTS ASSOCIATION

Convention: June 11-13 (The Griswold, Groton, Connecticut).

AMERICAN SOCIETY FOR TESTING MATERIALS

Annual Meeting, June 18-22, Atlantic City, N. J.

Spring Meeting and Committee Week, March 3-7, 1952, Cleveland, Ohio.

Annual Meeting, June 23-27, 1952, New York, N. Y. (The biennial Apparatus and Photographic Exhibits will be held in conjunction with this meeting).

FIBER SOCIETY

Meetings: September 13-14 (Swampscott, Mass.); April 16-17, 1952 (Clemson House, Clemson, S. C.)

NATIONAL ASSOCIATION OF TEXTILE MACHINERY MANUFACTURERS

Exhibit of American Textile Machinery, April 26-May 1, 1954, Atlantic City Exhibition Hall, Atlantic City, N. J.

SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS ASSOCIATION OF THE UNITED STATES

Luncheon Meetings—Hotel Commodore (September 12, October 10, November 14).

Spring Outing—The Greenbrier, White Sulphur Springs, W Va (June 14-16).

Annual Meeting and Dinner—Hotel Commodore (December 11).

TEXTILE RESEARCH INSTITUTE

Annual Meeting, Nov. 8-9.

Two Interior Views of the New Blackman-Uhler Dye Laboratory

• More Than 10,000 View KAE

The 40th Knitting Arts Exhibition, held last month at the Atlantic City Auditorium, is reported to have attracted over 10,000 visitors. Over 210 exhibitors, occupying 538 booths, presented a vast panorama of new machines, equipment, auxiliaries and publications relative to the knitting trades.

Emphasis on old and new finishing processes in the field appeared to be aimed to a greater degree than ever toward synthetic yarns and their end products, as exemplified by new shrinkage control methods, package and skein dyeing processes, new dyestuff application methods and resin finishes. Concurrently with this new emphasis, a greater problem of static control has unfolded, it is pointed out.

The five-day exhibition, which is sponsored semi-annually by the National Association of Hosiery Manufacturers, ran in conjunction with the 14th Hosiery Conference. The latter affair attracted approximately 750 to its two-day session, at which several prominent hosiery trade and government officials spoke. Featured speakers included Earl Constantine, NAHM president; Robert M Hanes, Wachovia Bank & Trust Co; Brig Gen H L Peckham, Commander of the New York Quartermaster Procurement Agency; and Lowell B Mason, Commissioner, Federal Trade Commission. A discussion forum on "Emergency Controls" followed.

• Morningstar, Nicol Opens 100th Anniversary Celebration

May 1 was recently designated by president Joseph Morningstar as the opening date of the 100th Anniversary of the founding of Morningstar, Nicol, Inc, New York manufacturers of starches, dextrines and adhesives. During the next eight months there will be a series of events to mark the centennial.

Mr Morningstar, grandson of Charles Morningstar, who in 1851 founded Charles Morningstar and Company in New York, also announced that to mark the Hundredth Anniversary the Company has put into effect a profit-sharing plan to benefit all employees with two or more years of continuous service. The profit-sharing plan includes the employees of all the subsidiary companies: Paisley Products, Inc, Chicago, Ill; Aroostock Potato Products, Inc, Houlton, Maine; and Park-Leggett-Altman Company, Minneapolis, Minn. The company owns manufacturing plants in New York, Hawthorne, N J, and Houlton, Me. They are also importers of tapioca flour from Brazil, arrowroot from the West Indies, starches and tropical gums.

Joseph Morningstar

The Company acts as sole selling agents for Magic Valley Processing Company, Twin Falls, Idaho, and the New England Starch Company, Houlton and Mars Hill, Maine.

Associated with Mr Morningstar are his two brothers, Robert P Morningstar, of New York and Percy P Morningstar, of Boston; his son, Thomas Morningstar of New York; and one nephew, Joe Barry Morningstar, of New York. George J Muller, of New York, first vice-president of Morningstar, Nicol and Murray Stempel of Chicago, second vice-president, are associated both with Morningstar, Nicol and with Paisley Products.

• "Dyestuffs" Carries Article on Nacconol NR Applications

A timely article, which describes the many textile applications that have been developed for the synthetic detergent, Nacconol NR, is presented in the current issue of "Dyestuffs", a publication of the National Aniline Division of Allied Chemical & Dye Corporation. The article was written especially for "Dyestuffs" by Dr O M Morgan of the National Aniline Division. Dr Morgan has been in charge of detergent application research for seventeen years and is a qualified authority on synthetic detergents and their applications.

In view of the many demands already being placed upon the industry as a result of a tremendously stepped-up production, and the shortages in basic materials that naturally follow, the article most timely.

New methods are described which reportedly can lead to marked increased production with savings in processing chemicals, fuel and water, the three important items in wet processing of textiles. These economies can be had, it is stated, without any new equipment or basic changes in present processing methods. Novel short-cuts are also described where suitable equipment is available or can be purchased, such as an all-acid process for fulling, scouring, and dyeing of wool. All types of goods are covered including wool, other animal fibers, cotton, synthetic fabrics, silk and mixed goods.

Copies of "Dyestuffs" may be obtained by writing to National Aniline Division at 40 Rector Street, New York 6, New York, or any of its branch offices.

• Klipstein Succeeds Bates as NPA Chemical Division Head

The National Production Authority, U S Department of Commerce, announced on May 2nd resignation of Joseph S Bates as director of the Chemical Division and the appointment of Kenneth H Klipstein to succeed him.

Mr Bates took a temporary leave of absence in October, 1950, as president of the Bates Chemical Company to go to Washington to head the Chemical Division. He said the pressure of personal affairs prompted his resignation.

Mr Klipstein has been deputy director of the Chemical Division. He is on leave from his position as assistant general manager and head of the Technical Department of the Calco Chemical Division of the American Cyanamid Company, Bound Brook, New Jersey.

His duty as director of the Chemical Division will be to further the overall NPA policy which seeks to insure supplies of critical materials for defense and defense-supporting needs with as little displacement to civilian industry as possible.

• Belle Transfers Boston Office

George O Linberg, vice-president of Belle Chemical Company, Reading, Pa, has announced the moving of the Boston office from 19 High Street to 581 Boylston Street.

Mr Linberg, an AATCC vice-president, was reelected on April 26 to the vice-presidency of the Drysalters Club of New England.

George O Linberg

E R Schwarz

• E R Schwarz to Receive Smith Memorial Medal

It is learned that Professor Edward R. Schwarz, head of the Textile Division, Massachusetts Institute of Technology, is to be the recipient of the Harold DeWitt Smith Memorial Medal at the October meeting of ASTM Committee D-13 on Textile Materials.

The medal, which is a testimonial to the memory of the late Harold DeWitt Smith, an outstanding textile scientist, has been made possible through the generosity of the Fabric Research Laboratories, Boston, Massachusetts. It is awarded at intervals of not less than one year by Committee D-13 for outstanding achievement in the field of textile fiber science and utilization, which includes the development and promotion of knowledge of textile fibers and structures and/or methods for the evaluation of their properties. The selection of a candidate to receive the award is effected by a committee of five consisting of the Chairman of Committee D-13; a member of the faculty of an educational institution awarding degrees in science or engineering; an employee of a concern manufacturing textile fibers or textile structures; a textile scientist with an established reputation; and a member at large. The first award was made in 1950 to Dr Herbert F Schiefer, Chief Physicist in the Textile Section of the National Bureau of Standards. The presentation to Professor Schwarz will be the second Medal to be awarded.

Professor Schwarz is prominent in many scientific societies both in the United States and abroad.

He was awarded the highest honor of the AATCC, the Olney Medal, in 1947.

• 160 Attend 7th GAF Research and Development Conference

160 men and women of General Aniline & Film Corporation's technical and scientific staff were on hand for the Seventh Annual Research and Development Conference, which was held April 29-May 1 at Pennsylvania's Skytop Lodge, in the Poconos.

At the technical sessions on Monday and Tuesday, sixteen papers were given by General Aniline staff members on subjects relating to dyestuffs, acetylene chemistry and photography.

Principal speaker at the traditional Sunday night banquet preceding the two day technical meeting was Charles E O'Hara of the New York City Police Department. Mr O'Hara, a college professor of physics and mathematics before joining the N Y Police Department, and the co-author of "An Introduction to Criminalistics", a leading work on scientific crime detection, told the group about many of the problems that beset the police and how the application of modern laboratory techniques help to solve them.

Mr O'Hara said that the New York Police Laboratory is keeping pace with the rapid advance of science and that recently in connection with a move to larger quarters, the Department had added an electronmicroscope, an infra-red spectrometer, an X-Ray diffraction camera and a spectrophotometer to its other equipment.

Invitations to the annual conference are arranged so that each member of the Research and Development Department is enabled to attend at least once every three or four years.

• Dunham Honored by Hercules

Russell H Dunham, first president and first chairman of the board of Hercules Powder Company, was honored last month for his leadership in the creation of the company's research laboratories in Wilmington in 1930. The ceremonies took place at a luncheon at the Hercules Country Club and marked the twentieth anniversary of the opening of the Hercules Experiment Station.

Attending the luncheon were Charles A Higgins, president, members of the board of directors, departmental executives, and representatives from the Experiment Station.

Dr Emil Ott, director of research, presided over the ceremonies and praised Mr Dunham for having the vision and courage to establish the Experiment Station at a time when most research was being cut back.

Dr Robert Cairns, assistant director of research, presented Mr Dunham with a group of three photographs as a memento of the opening of the Station. The photographs, in a silver frame, include a picture of Mr Dunham laying the cornerstone of the first building, an aerial view of the Station twenty years ago, and a recent aerial view showing the expansion during the last two decades. The photographs were a gift from the supervisory staff of the Research Department.

Testimonials signed by all 700 members of the Research Department and also the Country Club staff were presented to both Mr Dunham and Mr Higgins.

The first Hercules research laboratory was opened at the Kenvil (New Jersey) Plant in 1916. The growth of the company's research in the decade following World War I led to the decision to build a large central research laboratory near the company's headquarters in Wilmington. Construction started in 1929, and the cornerstone of the main building at the Hercules Experiment Station was laid in July, 1930. Since then the research laboratory has undergone many expansions, the most recent one being a three-story addition to the main building.

Mr. Dunham took office as the first president of Hercules late in 1912 when the newly-organized company began functioning. Although he resigned as company president in 1939, he remained chairman of the board of directors until June, 1944. He continues to serve as a director of the company, and as chairman of the finance committee.

• Hooker Opens New Purchasing Office

The opening of a new Hooker Electrochemical Company purchasing office at the corner of Buffalo Avenue and Iroquois Street, Niagara Falls, N Y, has been announced by H W Hooker, Jr, purchasing agent. There is no change in the mail address.

The new offices are directly across Buffalo Avenue from the west end of the main plant. The company points out that the new, larger facilities will be a convenience to visitors at the purchasing department as they will not need to first enter at the main plant guard house.

• L & N Moves Boston Office to New Location

The Boston office of Leeds & Northrup Company, Philadelphia manufacturers of electrical measuring instruments, automatic controls, and heat-treating furnaces, has been moved to new, larger quarters at 430 Lexington Avenue, Auburndale (Boston 66). The company states that the new facilities will afford better service in the Boston area.

• "Dacron" Suits Reported Wrinkle-Resistant in Humidity, Rain

In a talk by Dr L L Larson, manager of the Sales Development Section, Nylon Division, du Pont Company, before the AATT on May 2 (and also before the Fashion Writers on May 3), the wrinkle-resistant properties of "Dacron" polyester fibers were dramatically pointed out.

Dr Larson displayed a trim-looking business suit that had been subjected to two wearings in a swimming pool, used 67 days, and washed once in a washing machine. Other displays included a top-coat that had been worn 100 days without pressing, including several times in the rain, and a suit that showed practically no signs of wear after 250 days of hard usage.

Several outstanding properties of the new polyester fiber were pointed out throughout Dr Larson's talk including crease-resistance, dimensional stability, outstanding performance in laundering and resilience.

Possibilities of "Dacron's" use in blends were outlined along with a discussion of the numerous end uses of the new fiber, in addition to suitings. These included, among others, dresses, blouses, shirts, sweaters, knitting yarns, outerwear, socks, curtains and lingerie.

The mens' suitings displayed at the AATT meeting were a variety of colors. Dr Paul Meunier revealed that the dyeings were accomplished in a closed kettle with benzoic acid and the acetate colors.

In reply to a question as to whether it was possible to get an effect through finishing of fabrics that would be equivalent to the fulling of wool, Dr Larson said "Dacron" did not full. He said it was a problem to get reproducible sizes in sweaters, for example. He pointed out that the fiber will shrink, but there is at present some trouble in getting controlled shrinkage.

• New United Officers Slate

At a special meeting of the newly-elected Board of Directors of the United Dye & Chemical Corporation, the following officers were installed: *Chairman of the Board,* Robert H Bailey; *President,* David S Fischman; *Executive Vice-president,* Malcolm W Armstrong; *Vice-president & Treasurer,* Harold E Mitchell; *Secretary,* Frederick C Fuller.

The Corporation's new Executive Board comprises: Malcolm W Armstrong, Robert H Bailey, Joseph C Baldwin, III, Roy C Chapin, David S Fischman, Frederick C Fuller, Alexander E Joffe, Harold E Mitchell.

1951 Officers of the GDGA
(Seated, l to r)——Fred Nuttall, Walter Loebl
(Standing, l to r)——Allan J Copeland, Stanley Simon, Leon Teichner
John Egli was not present when this photograph was taken.

• Loebl to Head Garment Dyers Guild

Walter Loebl, head of the Loebl Dye Works, Roanoke, Va, was advanced at a recent meeting in Atlantic City to the presidency of the Garment Dyers Guild of America. The slate of officers, named at the three-day parley of the Guild in connection with the NICD Convention, includes, in addition to Mr Loebl, the following:

Vice-president—Fred Nuttall, Electric City Dyers, Scranton, Pa

Secretary-treasurer—John Egli, General Dyeing Co, Indianapolis, Ind

Executive secretary—Allan J Copeland, Allan J Copeland Advertising, Chicago, Ill

Past Presidents—Stanley Simon, Tru-Color Works, Brooklyn, N Y; Leon Teichner, Almore Dye House, Chicago, Ill.

In other business, the membership enthusiastically backed the program of promotion and education as developed by the Plans Board and all present pledged 100% financial support for anticipated expenditures. Inasmuch as most absent members were represented by proxies, the entire Guild is committed to a program that will embody intensive advertising, sales promotion and publicity both to the trade and to the consumer, it is reported.

The Guild has also agreed to maintain standards of quality among its membership in order to build up reputation and confidence with its customers, the drycleaners. They state that quality of product will be the only criterion governing the acceptance of new members, and dyers of any size will be welcome as new members as long as they deliver dyeing that will reflect credit to the other members.

In a two-point campaign, the Guild has announced its intention to

(1) "help drycleaners get more out of the dyeing than they have in the past—to assure them better and more dependable service and ease of finishing", and

(2) direct "information and education towards the customer of the drycleaner—the American housewife—to encourage her to employ dyeing as a means of enjoying longer-lasting, better looking and more colorful garments".

The Guild suggests that, particularly in periods of material and money shortages, the dyer can concentrate vastly to conservation of the manpower that would otherwise be needed to fabricate new materials and new garments. They point out that by salvaging and making again wearable an otherwise discardable garment or household article, the dyer performs a real service to the national economy. In co-operation with the National Institute of Cleaning and Dyeing, this story will be told nation-wide.

To help the drycleaner merchandise dyeing profitably to his customer, a wide-range program of promotional material will be made available "as rapidly as possible". Sales aids such as hanger cards, counter and window displays, truck and window decals and other material are being prepared. Advertising mats, radio copy and other such things are under way.

An expanded membership is another goal of the Guild to make it nation-wide and completely representative of the industry. They invite qualified dye houses to contact the office of the Executive Secretary, Allan J Copeland, 179 W Washington St, Chicago 2, Ill. Drycleaners interested in further information of any nature are also invited to write.

New Geigy Office on M Street, Philadelphia

• New Office Opened by Geigy in Philadelphia

After 50 year's occupation of the premises at 46 North Front Street, the Geigy Company, Inc, Dyestuffs Division has announced the opening of new, improved facilities at 3901 M Street, Philadelphia, Pa, where a new, modern laboratory and greatly increased warehousing and shipping facilities are designed to better serve the area covered by the office.

R L Quinn, who has been in the employ of Geigy for over 50 years and for many years has been manager of the Philadelphia office, will retire from the Company on June 30, 1951. He will be succeeded by Herman L Steen. Mr Steen joined the Company more than 15 years ago, and has been intimately connected with the technical and sales ends of the business during that time.

• ACC in New Plant Site Agreement

American Cyanamid Company and Clinchfield Coal Corporation announced on May 1 the execution of agreements providing for the purchase by Cyanamid of a plant site with a long-term lease of coal reserves on the property of Clinchfield in Southwest Virginia. The future development of these properties for the manufacture of chemicals, utilizing coal to be furnished by Clinchfield, is under consideration by Cyanamid.

• New Para-chloro-benzaldehyde Plant in Construction

As part of a general expansion program for this year, Heyden Chemical Corporation is constructing a new plant at its Fords, New Jersey Division for the production of para-chloro-benzaldehyde, which is used primarily for dye intermediates and insecticides. The new plant will be used to bring the production of para-chloro-berzaldehyde from pilot plant to commercial scale.

• Nonmelting Lubricating Grease

"Kantmelt," a new lubricating grease manufactured by Specialty Products Company, 190 Warren St, Jersey City 2, N J, is designed for use on plain or antifriction bearings in industrial locations where both "cling" and lubricity of the lubricant are to be maintained despite high operating temperatures.

The product, a synthetic grease (said to be devoid of metallic soaps, fatty acids, filler, water and alkali), is reported to be completely stable under all conditions of service and storage. SPC states that "Kantmelt" holds its lubricity and maintains perfect adhesion at the most elevated temperatures.

Specialty Products Company will send a liberal sample for test purposes to any organization requesting it on their letterhead.

• Fall and Spring Meeting Dates for Fiber Society Set

The Fall Meeting of the Fiber Society will be held September 13-14 in Swampscott, Mass. The dates for the Spring Meeting in 1952 are April 16-17; it will be held at the Clemson House, Clemson, S C.

• AHCO Improves Laboratory Service

Arnold, Hoffman and Company, Inc, Providence, R I, has revised its entire sample packaging and laboratory report methods in an effort to improve service.

The new laboratory report forms are entirely self-contained and provide a sturdy customer record for ready reference. The new sample packages are designed to insure safe arrival of liquid and powdered samples and give immediate shelf identification if used in storage space. The company has also adopted a new sample bottle label, which reportedly will give spot shelf identification.

• Alexander Smith Acts to Consolidate Management

A broad realignment of the organization and executive personnel of Alexander Smith, Inc, has been announced by William F C Ewing, president and chairman of the board. Announcement of the move, which is designed to bring the diversified operations the Alexander Smith and its subsidiaries under a "consolidated management", follows authorizing action taken by the newly-elected board of directors at its first regular monthly meeting on April 26th.

Under the new organizational setup, a carpet division, a linoleum division and a new products division will operate immediately under the president and the executive vice president of Alexander Smith, Inc.

Mr Ewing, formerly president of Alexander Smith & Sons Carpet Company, becomes president and chairman of the board of Alexander Smith, Inc.

HOULDER HUDGINS, president of the company's subsidiary, Sloane-Blabon Corporation, since 1939, becomes executive vice president.

JAMES M ELLIOTT, formerly president and general manager of General Bottlers, Inc, of Chicago, joins Alexander Smith as administrative vice president and treasurer, with responsibility for all financial and corporate phases of the company's operations.

WILBERT C HAMMEL, who has been vice president in charge of sales of Alexander Smith & Sons Carpet Company, becomes a vice president of Alexander Smith, Inc, and general manager of its carpet division.

LEE WATERMAN, formerly executive vice president of Sloane-Blabon Corporation, also becomes a vice president of Alexander Smith, Inc, and general manager of its linoleum division.

FRANK H HIGGINS is elected a vice president of the company and continues as general manager of its new products division, Alexander Smith Products Company.

Also elected vice presidents of Alexander Smith, Inc, were: HAROLD C ZULAUF, industrial relations; MAITLAND L GRIGGS, special services; JOHN GOODWILLIE, advertising and public relations.

In addition, ROBERT P RIDGES, formerly vice president and secretary, becomes vice president and comptroller of the company. WILLIAM J KENNEDY, formerly assistant secretary of the carpet company, was elected secretary and assistant treasurer.

NAMES IN THE NEWS

• H K Moeller, E A McAbee

HERMAN K MOELLER has been appointed manager of the fabric development section, rayon division, of the Du Pont Company's Rayon Department. His headquarters are in New York, N Y.

Mr Moeller joined Du Pont in 1940 as a technician in fabric sales development in the New York office. Since 1943, he has been a technical specialist there.

Mr Moeller succeeded E A McABEE, who had been manager of fabric development since 1945. Mr McAbee resigned from the company to engage in an enterprise of his own. He had been with Du Pont since 1939 when he joined the nylon division as a technical assistant in the sales development section.

• Willard de Camp Crater

Appointment of WILLARD deCAMP CRATER as assistant sales manager of Marvinol vinyl resins for Naugatuck chemical division, United States Rubber Company, was announced on May 9 by Harold M Parsekian, sales manager. In his new capacity, Mr Crater will develop new markets for vinyl resins and direct sales activities. He will make his headquarters in the division's Naugatuck, Conn, plant.

Mr Crater joined Naugatuck in December, 1949.

• Donald E Springer

E K Newton, chief engineer of Hooker Electrochemical Company, has announced the appointment of DONALD E SPRINGER to assistant chief engineer. Mr Springer has been with the company since 1936. Prior to this promotion, he was assigned to special projects, among which was the design of the Hooker-Detrex plant at Ashtabula, Ohio, that was placed in operation in June 1950.

Donald E Springer

Frank B Wolcott

• Frank B Wolcott

Appointment of FRANK B WOLCOTT as General Manufacturing Manager of Wyandotte Chemicals Corporation has been announced by Stephen T Orr, vice-president of manufacturing. Mr Wolcott was formerly in charge of manufacturing operations for the New Jersey Zinc Company.

As general manufacturing manager for Wyandotte, Mr Wolcott will have supervision over the company's chemical, compounding, quarrying, mining and transportation activities, most of which are in the process of expansion.

• Hodgen, Zayotti, Carroll

Since the Spring Semester at the Philadelphia Textile Institute, three members of the faculty and staff have been recalled to active duty in the Army, Navy and Marine Corps.

ALDEN R HODGEN, who was recalled to active service with the United States Army as a Captain was a former instructor of mathematics. HAROLD ZAYOTTI, who was recalled to active service with the United States Navy as a Lt j g, was a former instructor of Weave Formation and Fabric Development. Mr Zayotti is now stationed at the Pentagon in Washington. STUART H CARROLL, who was recalled to active duty in the United States Marine Corps as a First Lieutenant reported to the Marine Base in Parris Island, South Carolina, on May 7th. Mr Carroll was Treasurer and Executive Secretary of The Philadelphia Textile Institute Foundation.

• W D Thomas, Jr, J B Peeso, Jr

Industrial Chemicals Division of American Cyanamid Company has announced that W D THOMAS, JR has been appointed a technical representative of the Petroleum Chemicals Department. His new duties will involve the assembling and correlation of technical information gained in the field, for guidance of Cyanamid development programs.

J B PEESO, JR will take over Mr Thomas' former duties as group leader of the Petroleum Chemicals Laboratory, Technical Service and Development Division, Stamford Research Laboratories.

Mr Thomas joined the Cyanamid organization in 1940 as a member of the Petroleum Chemicals Laboratory. Mr Peeso joined the Company in 1946.

• R W Hooker

R W HOOKER, vice-president in charge of sales, Hooker Electrochemical Company, Niagara Falls, N Y, has been elected a director-at-large of the Armed Forces Chemical Association, according to an announcement made at the closing banquet of the Association's Sixth Annual Meeting held at Atlantic City, May 6.

Mr Hooker is a charter member and the Hooker Company is one of nine sustaining members of that organization.

• Dr E I Stearns, Dr H E Kienle

Dr E I STEARNS has been named assistant to DR R H KIENLE, director of the Application Research Department, Calco Chemical Division, American Cyanamid Company. In his new capacity, Dr Stearns will conduct special research, technical evaluation and field service assignments.

Dr Stearns, who joined Calco in 1933, has specialized in the phase rule, ultraviolet and spectrophotometry, photochemistry, instrumentation, optical properties of pigments, dye application and ornithology.

Dr E I Stearns

E P Henley

• E P Henley

E P "GENE" HENLEY has been added to the sales staff of the Dexter Chemical Corporation, Textile Chemical Division, New York. His headquarters are in Greensboro, N C, from which he will cover eastern North Carolina and Virginia.

Mr Henley had been selling heavy chemicals for Mathieson Alkali; previous to that association he worked with Burlington Mills on dyeing and finishing operations.

• Harold E Gile

Watson-Park Company has announced that HAROLD E GILE has joined their research staff. Mr Gile is a charter member of the AATCC and has been engaged in dyestuff sales and application work in both the leather and textile fields.

• K E Mulford, J R Frorer, J P Kass, K R Brown

KENNETH E MULFORD has been appointed General Manager of Atlas Powder Company's Industrial Chemicals Department, succeeding J R FRORER, who was elected a vice president of the company at a meeting of the Board of Directors May 2, 1951. J PETER KASS was named Director of the Research and Development Department, succeeding K R BROWN, who was elected vice president.

Mr Mulford, who had been Assistant General Manager of the Industrial Chemicals Department since 1948, joined the Atlas Legal Department in 1934. Later, as assistant director of that Department, he worked closely with the organic chemicals end of the business on sales development of new chemicals.

Dr Kass, Associate Director of the Research and Development Department since 1948, joined Atlas in 1947 to direct organic research work following four years connection with the Interchemical Corporation.

• Morse G Dial, Dr George O Curme, Jr

MORSE G DIAL has been elected executive vice-president of Union Carbide and Carbon Corporation and DR GEORGE O CURME, JR has been elected vice-president in charge of research. Both announcements were recently made by Fred H Haggerson, president.

Mr Dial joined the Corporation in 1929 as a member of the sales staff. Since 1949 he has been director, vice-president and treasurer.

Dr Curme, a pioneer in research, will now head all the research activities of Union Carbide. Since 1948 he has been vice-president in charge of chemical research, and for many years was a vice-president in both the Bakelite Company and the Carbide and Carbon Chemicals Company, both important divisions of Union Carbide.

• George C Sheldon

GEORGE C SHELDON of Lexington, Mass, has been appointed sales manager for the American Resincus Chemicals Corporation. Mr Sheldon was with Union Bay State Chemical Company as sales manager for 6½ years, and later was sales manager for General Latex and Chemical Corporation, prior to this latest appointment.

• F H Haggerson

FRED H HAGGERSON, President of Union Carbide and Carbon Corporation, has also been elected Chairman of the Board of Directors. Mr Haggerson has been President of Union Carbide since 1944, and has been associated with the Corporation for over 30 years.

OBITUARY

Parker M Smith

PARKER M SMITH

PARKER M SMITH, 58, president of Smith, Drum & Company, died at his home on April 25. His father, Robert P Smith, was one of the founders of the Philadelphia firm and also its first president.

Mr Smith joined Smith, Drum in 1912 and held the post of assistant to the vice-president until 1937 when he became president. At this point his concern began building machinery for the dyeing of cotton yarn in package form, incorporating new ideas, which provided a means for automatically controlling the process.

Through his leadership, the firm was given, in 1940, the Pioneer Award of the Frontier of America Industry for distinguished achievements in the field of science and invention.

He is survived by his wife, Estelle Magill, and a brother, Nelson M who is also associated with Smith, Drum & Co.

DAVID C SCOTT

DAVID C SCOTT, 66, died on May 13 after a long illness. As president of Scott Testers, Inc, Providence, R I, Mr Scott had an international reputation as an authority on physical testing of textiles and rubber.

The holder of many basic and minor patents relating to testing, Mr Scott was credited with several improvements in the physical testing of textiles, rubber and allied materials over the last forty years.

He held membership in the AATCC; the Textile Institute; the Textile Research Institute; the American Society for Testing Materials; the Board of the American Chemical Society, Rubber Division; the Society for Experimental Stress Analysis, and the American Society of Mechanical Engineers. Mr Scott also belonged to the Chemists' Club (New York) and the British Empire Club (Providence).

He leaves his wife, Susie Sherman Scott; three children, Mrs W Chesley Worthington, James M Scott and David C Scott, Jr; a sister, Mrs Royal Babcock, and six grandchildren.

EDWARD JOBBINS

EDWARD JOBBINS, 64, a director of W C Hardesty Company, New York manufacturers of fatty acid products, died on April 21st in Washington, D C. He had been serving there as a consultant for the Office of Price Stabilization.

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VIOLET-ever fresh . . . BY PACIFIC MILLS

Here man outdoes nature . . . with a violet shade that holds its freshness.

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A delight to the wearer, they are also a favorite of dyers and finishers, too. They are unsurpassed for level-dyeing properties, even in the lightest shades, and retain their full brightness throughout processing.

For *any* chrome, acid or direct dyes . . . or auxiliary chemicals . . . for both natural and synthetic fibres . . . be guided by the successful "color achievements" you see in these Sandoz advertisements.

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New Sandoz CUPROFIX colors and after-treatment give cotton and rayon fabrics a high degree of fastness to washing, perspiration and sunlight — comparable to more expensive vat dyeing. CUPROFIX *alone* gives you *triple* fastness in direct dyeing. Write for booklet on CUPROFIX, already adopted by many mills.

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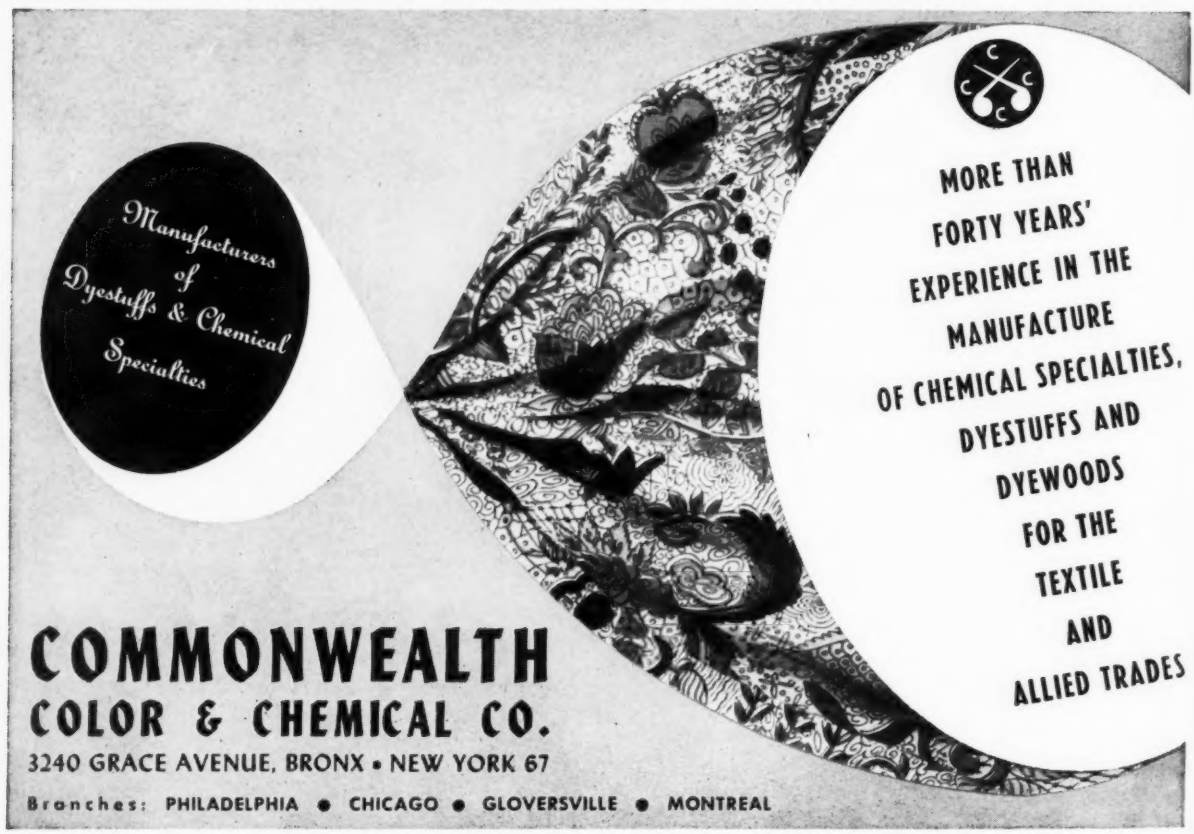
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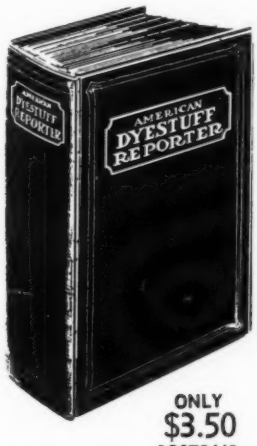

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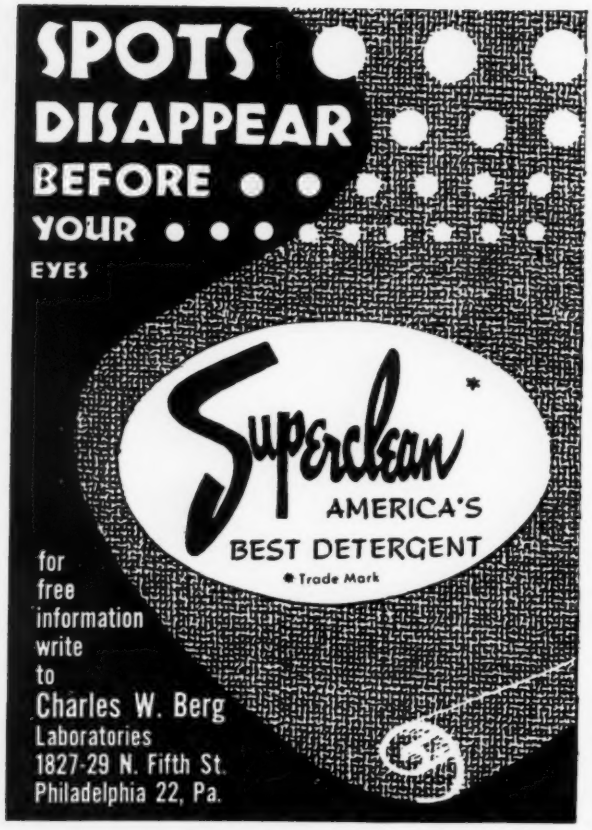

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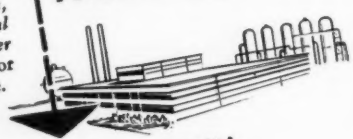

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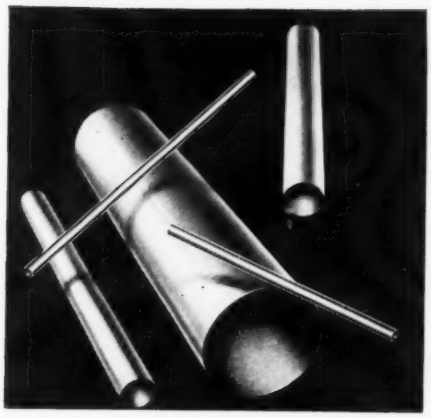

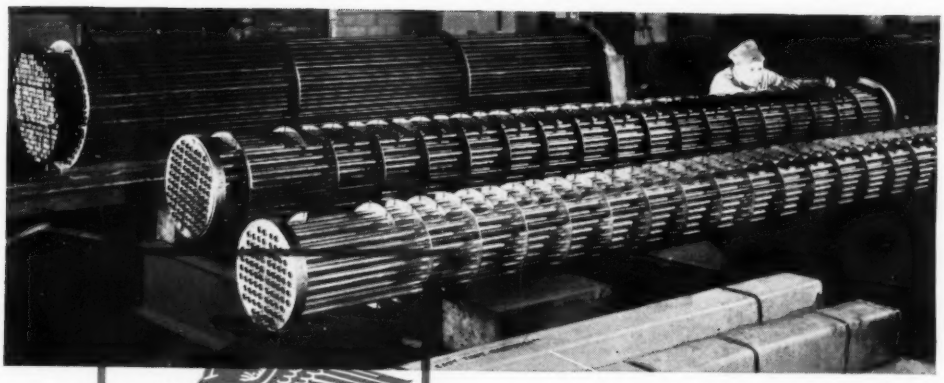

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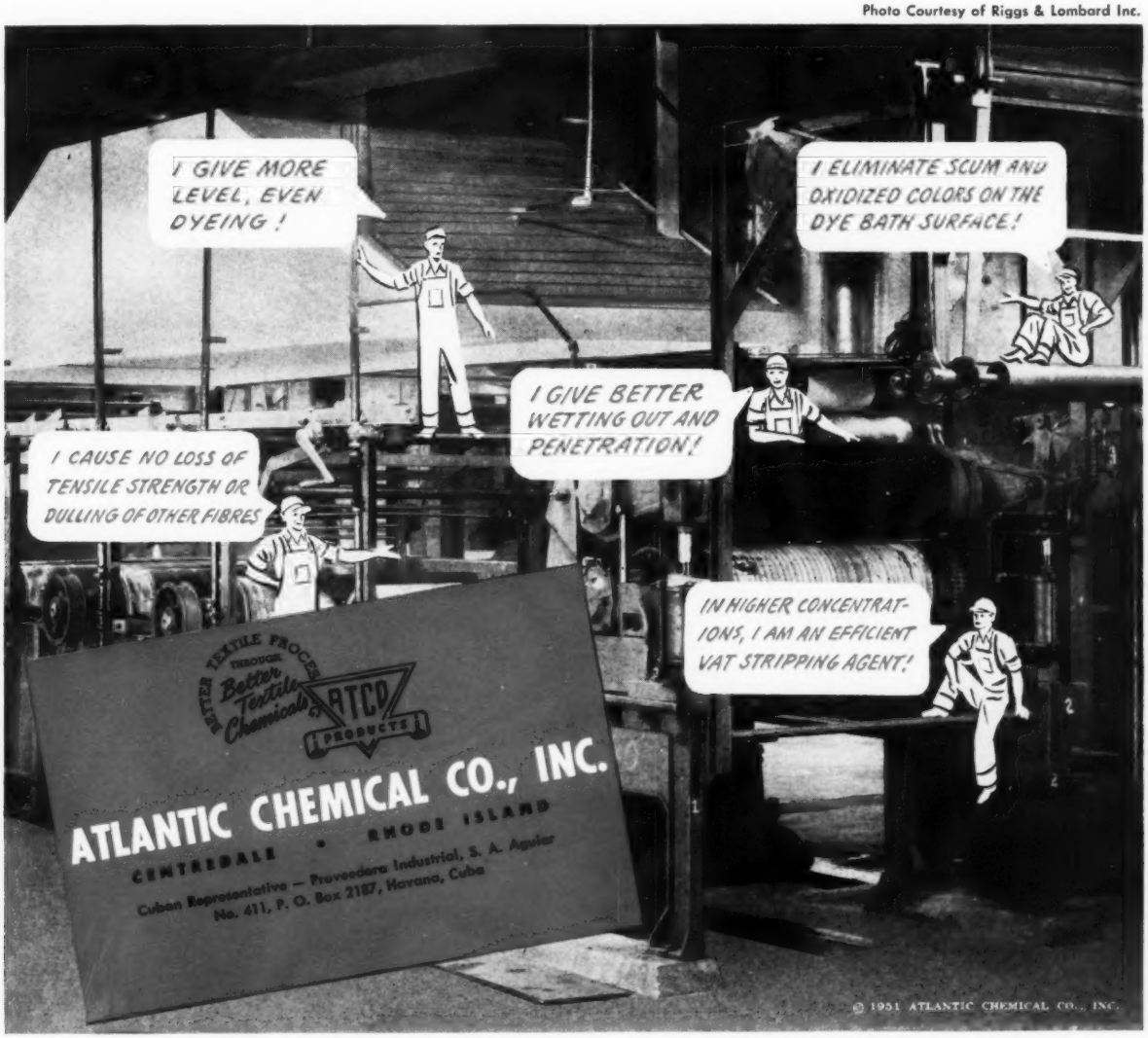
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